

The Commonwealth of Massachusetts

ANNUAL REPORT

OF THE

Mass.: Dept. of Conservation;

DIVISION OF FISHERIES AND GAME

FOR THE

YEAR ENDING NOVEMBER 30, 1923

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DEPARTMENT OF CONSERVATION
MASSACHUSETTS



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CONTENTS.

	PAGE
General Considerations	3
Personnel	4
Finances	4
Conferences	5
Activities outside the State	5
Courtesies	5
Enforcement of Laws	6
Equipment	6
Co-operation	7
Legislation	7
Education and Publicity	7
Biological Department	8
Wild Birds and Animals	8
Migratory Birds	9
Upland Game	11
Enemies to Game	13
Reservations	14
Inland Fisheries	16
General	16
Trout	16
Chinook Salmon	17
Pike Perch	17
Pickerel and Pike	17
Bass	17
White Perch	17
Smelt	18
Horned Pout and Catfish	18
Bluegill, Calico Bass, Long-eared Sunfish	18
Ice Fishing	18
Ponds	18
Public Rights	18
Ponds stocked and closed	19
Privately-owned Ponds Stocked	19
Fishways	19
Pollution	21
Propagation of Fish and Game	22
Fish Hatcheries and Game Farms	22
Field Propagation — Pond Cultural Methods	25
Shaker Mill Pond	25
Stockwell Ponds	25
Fish and Game Distribution	26
Marine Fisheries	29
Inspection of Fish	29
Deep Sea Fisheries	32
Shore Fisheries	42
The Lobster Fishery	43
Bounties on Seals	43
Mollusk Fisheries	43
Shad	44
Alewife	44
Appendix — Recommendations for Legislation	45

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The Commonwealth of Massachusetts

The Director of Fisheries and Game herewith presents the fifty-eighth annual report.

GENERAL CONSIDERATIONS.

Stripped of romance and sentiment the protection and restoration of wild life is a business proposition, differing only as to details from that of the poultry grower and the stock raiser. In the former case, as in the latter, to insure success the operator must have exclusive control over the ground on which he is to work, and have at his disposal those facilities which will combine to give results.

Under our form of government, where the individual owns the land and the central government has but very little voice in the control of that land (outside of the exercise of police power), it is apparent at once that the fundamental requirement for successful restocking does not exist, — which is, the necessary control over the land on which it is sought to protect and increase wild life.

Two illustrations will suffice. Last year this Division distributed upwards of ten thousand English ring-neck pheasants in various parts of the State. The State, acting through the Commissioner of Conservation, then established regulations as to the period of open season, fixed a daily and seasonal bag limit, and limited the shooting to cock birds. This is as far as the State can go, but it falls far short of the fundamental requirement — such absolute control over the land on which the wild life was liberated as would insure the greatest annual production of birds from the breeding stock remaining in the open. The land on which the birds were liberated is owned by a large number of individuals. They have the exclusive control of it. They can cut down the forests, drain the swamps, burn over the brush covers and make a given area which was attractive to the birds when they were first liberated, a desert.

Last year the State planted approximately one and a quarter million brook trout fingerlings in the streams. In nearly every instance these are unnavigable streams. The riparian owners on either side own the land underneath to the thread of the stream, and, (excepting certain State regulations as to pollution) have complete control over that section of the stream, under the obligation to pass the water on in equal volume and purity to the riparian proprietor below. From source to outlet, therefore, the small group of riparian owners on the streams has exclusive control over the waters. All the Division can do is to plant the fish, and the Legislature regulates the taking. Here again the fundamental requirement is lacking, namely, the right to do those things necessary to make the stream support the largest amount of fish life. The riparian owners may cut down all the timber, resulting in warming up the waters and causing flood conditions which change the entire character of the stream, and in innumerable ways may reduce it to a ribbon of waste water.

As far as the future can be forecasted, there is no assurance that these conditions will change. So long as they exist, the business of protecting and propagating wild life over the State as a whole can never be carried on with the greatest efficiency and the largest present and permanent results. The State that can adopt methods giving the necessary control over at least a reasonable amount of its area, will have the largest amount of wild life, relatively speaking. The only method available appears to be by the establishment of permanent wild life sanctuaries, owned by the State, on which the business of protection and propagation can be conducted without interference. Two or three such sanctuaries should be established in every county. They should be of sufficient size for all practical purposes (a fair tract being 2,500 acres), and the boundary lines should be clearly defined and adequately posted. A sufficient force should be maintained to protect the sanctuary at all times against poachers, and to carry on systematic reduction of all species classed as vermin to a harmless minimum.

In addition, those things should be done to gradually put the sanctuary in a position to support the largest amount of all forms of desirable wild life. It would be very interesting to go into many details on this last proposition, but one or two will suffice. The sanctuaries should not be chosen as a lumber and firewood proposition, but primarily for the production of wild life. However, those areas suitable for reforestation should be cultivated to supply, say in twenty-five to fifty years, all of the wooded area required. Food-producing grains, shrubs and trees should be planted in favorable locations. Sections of rank vegetation should be sufficiently cleaned out to sweeten and renew the ground. By diverting streams or damming up spring holes breeding grounds for ducks should be made. It is safe to say that the possibilities of this State for the production of black ducks alone have never been fully visualized. There are thousands of acres upon which a black duck has not alighted for the last twenty-five years, which could and would support large numbers of them with adequate preparation of the ground and suitable protection throughout the entire year.

In these sanctuaries the artificial propagation of various species should be carried on as intensively as the character of the ground will permit. Those in charge could annually hatch a substantial number of ring-neck pheasant eggs. In certain sanctuaries numbers of semi-wild mallards could be produced (it being difficult to breed the black duck in captivity). These sanctuaries would be producing areas from which, from time to time, the excess amount of stock could be distributed in areas open to public shooting. On them the wild life would have better protection than could be given to the species generally throughout the State. Therefore, during a severe winter, when the quail might be reduced on the range generally, the flocks under special protection in the sanctuaries could be drawn on to help re-stock the range.

Today we rely on the importation of white hares to keep up the stock. Should a neighboring state legislate to prohibit the exportation of hares we would find it practically impossible to keep up the supply. There are many areas in this State admirably adapted to produce a large number of white hares from which a reasonable number could annually be distributed in other sections. These permanent wild life sanctuaries could likewise be used by the public for general recreational purposes, as for example, a limited number of camp sites under proper regulations and for winter sports, as well as for observation by lovers of the out-doors at such times as would not interfere with the breeding seasons.

PERSONNEL.

On November 28 His Excellency the Governor re-appointed William C. Adams of Newtonville Director of the Division of Fisheries and Game for three years.

FINANCES.

	Appropriations	Expenditures	Balances
For salaries and maintenance . . .	\$210,900 00	\$201,303 56	\$9,596 44
For special purposes . . .	4,750 00	3,586 97	1,163 03
Available from 1922 balances . . .	691 57	665 06	26 51
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	\$216,341 57	\$205,555 59	\$10,785 98
Balances available for next year	1,149 13
	<hr/>	<hr/>	<hr/>
Returned to general treasury	\$9,636 85

The revenue turned into the State Treasury was: license fees (details follow), \$188,658.35; sales at game farms and fish hatcheries, \$242.90; sales of game tags, \$52.50; sale of forfeited goods, \$397.04; sale of shanty at Monomoy, \$50; lease of Chilmark Pond, \$75.00; lease of clam flats, \$60.00; total, \$189,535.79.

Receipts in Detail for Licenses.

	Total Number issued	Gross Value	Fees to Clerks	Net Return to State
Combination licenses . . .	46,958	\$97,308 00	\$7,043 70	\$90,264 30
Hunting licenses . . .	40,411	57,119 75	6,061 65	51,058 10
Fishing licenses . . .	49,536	53,791 00	7,430 40	46,360 60
Lobster licenses . . .	1,142	1,142 00	171 30	970 70
	138,047	\$209,360 75	\$20,707 05	\$188,653 70 ¹

The endeavor of the past few years to make the Division approximately self-supporting bids fair to be realized, for comparison of expenditures with revenue shows the percentages of operating costs met through income from licenses and a few other sources to have been: 1918, 38.8%; 1919, 42.3%; 1920, 49.3%; 1921, 56.2%; 1922, 81.8%; 1923, 92%. We may also mention that the money value of the hatchery output and the product of the salvage unit goes far towards offsetting the operating costs.

The condition at the close of the present year is a strong contrast to that prior to 1909, at which time the Division was supported almost entirely by funds raised by general taxation. We are not relaxing our efforts, but have pointed out to the Commission on Administration and Finance several directions in which savings may be accomplished or more revenue produced through slight changes in the laws. Among these may be mentioned: special trapping license; stopping the free issue of duplicates of lost licenses; extending the fishing license provision to all waters. Further, by making licenses more easily procurable, and by encouraging the non-fishing and non-hunting part of the public, which yet is interested in wild life, to make its contribution by taking out licenses, the income from this source would be swelled.

A radical change was worked out in methods of keeping license records, to go into operation in 1924. It simplified the records of both the town clerks and the central office, and will mean a yearly saving to the State of many dollars in clerical work, postage, and costs of material and printing. The size of the license is reduced from 102 square inches to 27 square inches, which will give a 75% saving in paper stock alone, with savings on printing and other expenses in proportion.

CONFERENCES.

The annual conferences between sportsmen, fishermen, bird lovers and the officials of the department, for discussion of proposed legislation, were held in Middleborough, Worcester, Springfield, Pittsfield and Boston, on lines similar to other such meetings.

ACTIVITIES OUTSIDE THE STATE.

The Conservation Commissioner and the Director were present at the Ninth National Game Conference of the American Game Protective and Propagation Association on December 12 and 13, 1922, which is the annual gathering of the game breeders of the country. The Director attended the meeting of the Advisory Board to the U. S. Biological Survey of the Migratory Bird Treaty Act, of which he is a member, in Washington, D. C., on Dec. 14, 1922; the meeting of the American Fisheries Society Sept. 17-19, and of the International Association of Game, Fish and Conservation Commissioners, of which he was President, the 20th and 21st, in St. Louis, Mo.

COURTESIES.

We are indebted to a large number of individuals and organizations for co-operation and courtesies which have made our work easier, more effective or more far-reaching. We are duly sensible of the value of such helpfulness, though it is impossible to give individual mention to each case.

¹ There was also a net amount of \$4.65 paid in on account of a short payment in preceding year.

ENFORCEMENT OF LAWS.

No material changes were made in the law-enforcement program or methods, and but one in personnel. Warden Orin D. Steele of Quincy resigned to accept a position as U. S. Game Warden and was succeeded by Forrest S. Clark.

Despite the encroachment upon law enforcement work of the increasing activities of the division in which the wardens are engaged in various capacities, the number of cases very nearly equalled the previous year, and the fines imposed were \$2,382 in excess of last year.

Number of cases, 534; convicted, 505; discharged, 29; (filed, 84, appealed, 21); fines imposed, \$8,481; costs paid, \$115. This does not include the cases presented to the Federal courts through the Federal warden, evidence for which was secured by the State wardens.

Licenses revoked: resident combination, 58; resident hunting and trapping, 31; resident fishing, 27; alien fishing, 8; alien hunting and trapping, 2; total, 126.

Violations of the lobster laws continue to hold front rank. 34 cases of taking "short lobsters" netted \$1,522, while 26 violations of other lobster laws, particularly fishing without a license, brought in fines aggregating \$1,200. The largest number of violations of any particular law was in the case of fishing inland stocked waters without a license. Under this charge 123 cases were brought to court, and \$995 collected in fines. Next in line comes hunting without a license, with 70 cases totalling \$580 in fines. It is now quite generally known that hunting and fishing licenses are required, and most of these cases can be attributed to carelessness or indifference.

The advent of Sunday sports had developed somewhat the erroneous idea that hunting on Sunday is allowable but 33 persons who contributed \$260 in fines for this offence now know otherwise.

The alien hunter still presents a problem in the enforcement of the game laws. 21 aliens were haled before the courts for the unlawful possession of firearms and they were fined a total of \$800 in addition to the loss of the firearms found in their possession. In addition, among the 39 cases of killing protected birds for which fines of \$795 were imposed the majority were cases of song-bird killing by foreign-born hunters.

Under the fishing laws violations of the trout appeared most numerous as 18 convictions under this heading brought fines of \$225, while violations of the pickerel laws numbering 17 cost \$51. Violations of the shore fisheries laws were also handled successfully as 11 violators of the scallop laws were fined \$188, 5 of the mackerel laws were taxed \$125 and 24 cases of illegal seining or trawling cost violators a total of \$315.

The oft-violated requirement of law that a hunting or fishing license shall be shown on demand of any person was sustained with a \$10 fine in a case complained of by a land-owner.

EQUIPMENT.

No greater contribution to the organization's efficiency can be noted than the addition of five new Ford touring cars during the year, bringing the total of state-owned cars to 14. The value and necessity of a motorized warden force has long been recognized, and this increasing percentage of motorization presages good results in this branch of the work in the future. However, to assure the best results and a standardized policy of operation each warden should have a state-owned machine.

The division operated two small power-boats during favorable weather which did good work in suppressing violations in the harbors, bays and rivers along the coast. Supplementing these was the Steamer "Lotus" of the Department of Public Safety, and because of the generous co-operation received from the officers of that department it was possible to apprehend many violators in the open waters into which the small boats could not venture. Several small boats with out-board motors attached, located in lakes and streams in different parts of the State, likewise did good service. The accumulated experience of years emphasizes the need of one or more specially constructed boats for patrol work along the shore.

CO-OPERATION.

While the result of public co-operation has been noted above in a general way, more specific mention may well be made of the assistance received by wardens from the various local police departments. The demands of brevity will not allow a recital of the instances in which these officers—and in some cases deputy wardens on our volunteer force, were responsible for or materially aided in the apprehension and prosecution of violators. The U. S. Game Warden for this district availed himself of every opportunity to be of assistance, and our appreciation of this found expression in the many instances where our wardens detected and reported violations of the federal migratory bird laws.

LEGISLATION.

Laws to accomplish the following were enacted by the General Court of 1923:—
Chapter 15, to repeal the special smelt law in the town of Rowley.

Chapter 35, to prohibit the use of beam and otter trawls in certain waters adjacent to Martha's Vineyard.

Chapter 68, to place the burden of proof on aliens to show their right to possess firearms or secure a license.

Chapter 99, to prohibit the use of all snares for taking animals.

Chapter 144, to allow cities and towns to pay their local fish and game wardens not exceeding \$100 per year.

Chapter 182, closing the season on quail in Hampshire, Norfolk and Worcester counties until 1925.

Chapter 185, to require trappers to report annually to the fish and game division.

Chapter 212, to place a close season on pike perch between February 1 and April 30, a 12-inch catch limit, and to prohibit sale.

Chapter 268, to prohibit sale of all fresh-water fish; to make permanent the 12-inch law on pickerel; to place a close season on horned pout from March 1 to June 15 and on yellow perch from March 1 to April 1; to change the catch limit of white perch from a weight basis to a numerical basis.

Chapter 269, to prohibit the sale of brook trout and place an 8-inch catch limit on brown and rainbow trout.

Chapter 301, to authorize the Commissioner of Conservation to accept in trust gifts of land and money for fish and game work.

Chapter 307, to make the state laws relating to migratory birds conform with the federal regulations. It also prohibits the use of a rifle, revolver or pistol on migratory birds; restores a uniform open season in all parts of the state, and restores state supervision over the possession and sale of migratory waterfowl.

Chapter 40, to protect the shad in Palmer's River along the same lines as by the Rhode Island law.

The recommendations made to the General Court of 1924 will be found in the Appendix.

EDUCATION AND PUBLICITY.

The usual educational and publicity work was pursued by the law enforcement organization, and consisted principally of illustrated lectures depicting various phases of fish and game propagation and the problems of law enforcement and conservation. The increased demand for these lectures from year to year from sportsmen's organizations, fraternities and school authorities indicates a whole-some interest in the cause.

The customary exhibit of live fish was put on in the divisional quarters at the State Building at the Eastern States Exposition grounds at Springfield and proved a source of great interest. No other exhibition work was attempted.

Timely articles were contributed to the press, acquainting the public with changes in the laws, fishing and hunting seasons, and giving other information concerning the work of the division and general conditions throughout the State.

BIOLOGICAL DEPARTMENT.

On the resignation of Dr. David L. Belding on March 1, Mr. J. Arthur Kitson succeeded him as biologist.

The greater portion of the year's work was concentrated on the problems connected with the stocking of the covers and waters, which is being recognized more and more as a biological problem. (See "Fish and Game Distribution"). In addition, autopsies and routine pathological examinations were made of waterfowl killed through contact with oil, diseased birds, fish and shellfish. Outbreaks of disease, or unusual conditions at the hatcheries, were studied and treated. Data was collected on the shellfish fisheries (more fully set forth under "Mollusk Fisheries"); stream surveys were made in connection with the distribution of fish. The work of restoring the alewife fisheries was carried forward by the installation of additional fishways and by plantings of mature alewives (for details of which, see "Fishways" and "Alewife").

WILD BIRDS AND ANIMALS.

WINTER FEEDING.

Field conditions in the winter of 1922-3 were very unfavorable for wild life. The winter, even into March, was a succession of storms and northeast gales of snow, rain, sleet, wind and low temperatures. The snow accumulated to great depths, effectually locking away the food and gravel from the ground-feeding birds. All agencies interested in wild life united in a determined effort to help the birds through by supplying emergency rations during the worst periods. Contributions of money from individuals amounted to \$51 and were expended in addition to the \$600 from State funds. Many of the associations and workers financed their own work. While there must inevitably have been a large loss of bird life, yet spring showed good numbers of breeders, in excellent condition. No serious situation arose for the sea fowl. Wardens put out feed around the fresh-water holes, and no unusual winter mortality was noted.

BREEDING SEASON.

Conditions in the breeding season were very favorable for a good production, the weather being good, not excessively cold, and no prolonged rains or damp periods, and few woods fires. By reason of the dry summer weather an unusual percentage of the young reached maturity.

FIRES.

The loss to wild life on account of woods fires must have been far less than last year, for (with the exception of two large fires) the acreage thus burned over in the breeding season was far behind the record of last year. Advantage is taken of every opportunity to remind hunters and fishermen of the obligation to use care with respect to fires, and that fires are a direct menace to their sport. Certain clubs do this by post-card reminders to their members and local sportsmen. The summer-long drought made necessary the closing of the hunting season, as set forth elsewhere.

POSTED LAND.

It is never possible at any time to give a complete survey of what is actually taking place in the attitude of the land owners. It may frequently be noticed that in a given county in a particular year there will be a large amount of posted land, with a much more liberal attitude the year following. There is very easy to discern, however, a steady absorption by individuals and clubs of the desirable hunting and fishing grounds. For example, we had the spectacle this year of the president of a fish and game association informing us that it would be useless to ship brook trout to his club this year, because every trout stream of any value within the section represented by the club had been posted against fishing.

MIGRATORY BIRDS.

Song and Insectivorous Birds.

Permits were issued to 68 persons for the collection of birds, eggs and nests for scientific purposes, sixty-six reports were made, showing 267 birds and 681 eggs had been taken. To persons acting for the Biological Survey in determining facts concerning bird migration, 246 bird banding permits were issued. (See Law Enforcement for protective work.)

Every year we are compelled to disappoint certain individuals who desire to make collections of birds and eggs for private use. Our aim is to issue permits only in those cases where the cause of science will be tangibly advanced, or young students encouraged to train for scientific research as a profession.

Migratory Game Birds.

Shore Birds. — There was nothing extraordinary about the spring movement of shore birds. The continued dry, fair weather through the late summer and fall caused a "spotty" migration. The usual numbers of birds were found in favorable localities at the opening of the season. These were practically all taken by the gunners within the first day or two, and from that time on there was only scattering shooting. It was later than usual when birds were seen in numbers, especially winter yellow legs and black-breasted plover.

Plover. — The spring migration of black-breasted plover was heavy on the north shore, where there was a large flight in May, also heavy locally on Cape Cod; elsewhere in the State, about as usual. Upland plover showed decidedly increased numbers, and there were at least as many killdeer and piping plover as last year, with local increases.

Snipe. — A scattering flight of Jack or Wilson snipe appeared in the spring in no more than ordinary numbers, and smaller in spots. Of the red-breasted snipe there was only a scattering along the southeast coast. In the fall, because of the excessively dry season, most of the snipe grounds were too dry to attract and hold the birds, resulting in but little shooting. In a few favored places, and rather late in the season, some birds were killed.

Woodcock. — The spring flight was well distributed over the entire State, and heavier than has been noted for several years. One reason for this may have been the rather favorable weather conditions in Massachusetts and the backward conditions further north, which tended to slow up the birds on their migration after striking this region. Eventually the most birds moved northward, though more bred here than usually is the case.

The fall flight was difficult to judge, for the country was so dry that in many regions the condition of soil and cover was very much changed. The flight was less clearly defined and fewer birds were shot than usual, but it is believed that the birds changed their locations to such an extent that many flight birds were overlooked. As a whole the movement was considerably later than usual. The indications are that the woodcock is at least holding its own, if not increasing.

Rail. — Good numbers of rail appeared on the spring flight. The dry conditions of the late summer and fall caused the birds to move off earlier than usual.

Sandpipers. — The spring and fall migrations of sandpipers showed no marked or unusual features. The numerical gain since Federal protection was given, is maintained.

Winter and Summer Yellow Legs. — Large numbers of both winter and summer yellow legs were observed on the northward migration, at the usual time, in a steady flight. A large flight of both appeared on the north shore May 17.

On the opening of the shooting season August 16 there was good shooting in many places, with the usual number of winter yellow legs mixed in with the summer yellow legs. At some localities, such as points on the north shore, the numbers were disappointing. Later in the season winter yellow legs showed in good numbers, but scattering, with few bag limits taken at any particular time.

Hudsonian Curlew. — Of the larger birds the curlew appears to be the only one holding its own, and perhaps slightly increasing in numbers. This is observed in both the spring and fall flights.

Wildfowl. — Since the abolishment of spring shooting, and the closing of all seasons the first of January, more and more birds are wintering in the coastal waters, especially whenever the winter is reasonably open. Despite the hard winter, large numbers of geese, red-heads, blue-bills and some canvasbacks wintered, especially in the region of Vineyard and Nantucket Sounds.

The spring migration had no unusual features.

The fall migration was very unsatisfactory; but few geese were killed. The pond fowl, — the term commonly used to designate blue-bills, red-heads, canvasback, widgeon and whistlers, — were present in fewer numbers and did not decoy as readily as usual.

Ducks. — The usual number of black ducks was reported during the spring and breeding season. For a short time after the opening of the shooting season they were quite plentiful in some localities, especially on the south shore and the outlying islands. There was less shooting on the north shore than for a couple of years. Reports indicate that in some localities there was an abundance of birds, but the kills at even the best equipped shooting stands were not up to the past records. Owing to the mildness of the season but few of the large northern ducks appeared prior to November 30.

The wood duck is increasing, and more reported than for a number of years.

The mallard duck is only an occasional visitor, and not an important factor in the shooting of this region.

The spring flight of red-heads was heavier than usual, but during the early part of the open season comparatively few had arrived.

The canvasbacks, which are also a minor consideration, were unexpectedly observed in small numbers in some of the inland ponds, with but few along the shore.

The spring flight of blue bills was rather heavier than ordinary, but up to the time of the closing of this report had not appeared on the fall flight in usual numbers. They were wary, did not decoy well, and the shooting was not up to expectations.

The spring migration of the scoters was normal, but the fall migration did not materialize in many localities. Though large flocks were observed going down outside, the shooting was ordinary.

Geese. — In spite of the small numbers of geese that were seen on the 1922 fall migration, the spring movement following showed no serious diminution. It seemed to be about an average year, with no marked increase or decrease over recent years, and on the whole, steady. According to reports from fishermen off Nantucket many flocks passed out to sea.

The fall flight was disappointingly small up to November 30. Why the geese failed to appear was a mystery to the oldest gunners. No large movements at any time were reported.

Brant. — There was an unusually large number of brant, locally estimated at a thousand, around Nantucket in the spring, and they remained until about the 25th of June. The fall flight opened with the appearance of a good-sized bunch around October 20. Many flocks passed by without stopping — young birds first and large ones later, not so numerous as last year, but still good numbers.

Statistics of the Gunning Stands. — Number of stands operated, 115; geese shot, 3,672; ducks shot, 9,930; live goose decoys, 3,854; wooden goose decoys, 3,751; live duck decoys, 5,412; wooden duck decoys, 3,509.

Migratory non-game Birds — Gulls and Terns.

No warden protection was given the breeding terns this year. The gulls and terns are so widely scattered along the coast that a larger force than we could finance would be required to give them complete protection. For some years past we have stationed a special temporary warden on the larger colonies in breeding time to reduce the vermin and prevent disturbance by man. Our activity over a period of years has spread the knowledge that these birds are protected, and in spite of the adverse circumstances with which the terns and gulls — as all other wild life — must contend, they are maintaining themselves reasonably well. A close watch of the situation will be continued, and protection resumed in any colonies where it appears imperative.

Federal Control of Migratory Birds.

At the beginning of the period of this report the Public Shooting Ground-Game Refuge Bill, representing the second great step in the protection of migratory birds through the federal government, was still in Congress. Early in December of 1922 it passed the Senate with every prospect of passage in the House, but parliamentary tactics from organized opposition which existed through misunderstanding of the provisions of the bill, defeated it by a narrow margin. A new draft of the bill has been prepared to be introduced in December of 1923.

UPLAND GAME.

The Hunting Season.

Throughout the summer there had been practically no rain, and by mid-October the woods were dry, the ground parched to a great depth, and the surface of the ground like tinder; swamps were dry or nearly so, and the fire peril a serious one. Conditions being as they were, His Excellency the Governor, under authority conferred on him by sections 29-31, Chapter 131, General Laws, suspended the season for the hunting of all kinds of game and animals from sunset of Oct. 19 until further notice. This was made public Oct. 16, that the sportsmen might have advance notice. On the 18th, 19th and 20th came rain sufficient to remove all danger, and a second proclamation lifted the ban at noon on the 20th and extended the open season on upland birds until noon on November 21. Though the season had been closed in other years, this is the first time it has been lawful (by the amendment of 1922) to restore the lost days.

Pheasants.— Though the winter was severe the pheasants which had survived the open season came through with no great loss, and spring found a good stock of breeders in nearly all sections. A scarcity of cocks was noted in some places, and there were reports of large flocks of hen pheasants, from 5 to 20, with only one or at most two male birds. This led in some cases to infertile eggs and poor production. This, too, may account for some of the reports of small and late broods. But on the whole a good production was indicated, and it was common to hear of numerous broods of young of good average size. Throughout the open season field conditions were very favorable for hunting, and the total number of pheasants reported killed was 2,283, divided as to county as follows: Barnstable, 14; Berkshire, 38; Bristol, 144; Essex, 303; Franklin, 79; Hampden, 170; Hampshire, 192; Middlesex, 476; Nantucket, 52; Norfolk, 196; Plymouth, 142; Suffolk, 3; Worcester, 470; locality not reported, 4.

Ruffed Grouse.— More grouse were left over at the close of the 1922 open season than for many years, and the winter-loss was slight in spite of the deep snows and hard weather. Spring found the covers well stocked with breeders, apparently strong and virile; weather conditions were excellent, excepting in a few localities, and even in those cases no great losses resulted, and reports were general in the summer, of large broods of well-grown young. The dry weather of the summer was favorable to their growth, and at the opening of the hunting season grouse were more numerous all over the range than had been the case for a good many years. Large coveys were the rule, and the young well grown and hardly distinguishable from the older birds. Owing to the summer drought the grouse worked into the swamps to quite an extent.

The gunning season opened with several rainy days and foliage still heavy on the trees over most of the State. While there was a liberal supply of birds in the covers, the unusual weather conditions had caused them to scatter more evenly over the country than is generally the case; so that, while good sport was afforded, it was unusual to move large numbers of birds in any one day.

Quail.— In the counties closed to quail shooting (Dukes, Essex, Hampden, Hampshire, Middlesex, Nantucket, Norfolk and Worcester) the situation is unchanged (with one exception) and the quail continues to be very scarce—scattered small flocks, or pairs. It is noticeable that the stock in these counties produces very few young, and they make little or no gain. The exception is Dukes County, which is steadily becoming repopulated with quail. There the winter-

kill was practically nothing, and large broods were seen, though the breeding season had been damp and foggy. In June, calls could be heard in all directions, and the quail were reported as very numerous.

In the limited section of the State where the quail thrive, it was a good year. The winter of 1922-3, though marked by severe weather and heavy snows, was not accompanied by any unusual loss of quail stock, owing to the absence of crust, and spring found them uniformly plentiful over the whole present range as well as in sections from which they had disappeared. The flocks were of good size and the birds in good condition, and with the favorable weather conditions there was an excellent production. The summer was dry and favorable to their growth, and when the gunning season opened the covers contained good numbers of well-grown birds. The quail ran true to form this year, taking long flights when disturbed and affording limited gunning at the best. The cleverness of this bird in eluding the gunner makes it certain that it will never, with our short season and limited bag, be exterminated by the gun. Severe winters and vermin are the greatest agencies of destruction.

Deer. — The figures for the open season on deer coming within the period of this report (Dec. 4-9, 1922) were: 1,581 deer killed, (922 bucks and 659 does), 449 in excess of the previous year, and the largest kill since 1913. They were divided as to county as follows:

Barnstable, 66; Berkshire, 284; Bristol, 47; Essex, 22; Franklin, 318; Hampden, 183; Hampshire, 179; Middlesex, 44; Norfolk, 11; Plymouth, 91; Worcester, 334; locality not given, 2. Over the greater part of the State the deer season opened with clear, cold weather and bare ground. On the second day a light fall of snow was favorable to the hunters, followed by bitter cold, high wind and rain, with clear weather the end of the week, though a crust formed which made noisy hunting and kept the deer on the move. The number of hunters was unusually large; the season was free from accidents; the laws were well observed (including the enactment of 1922 prohibiting dogs in the field during the deer week) and few crippled deer were reported after the season.

Notwithstanding the large number shot and the unusually large number (mostly does with fawn) run down and killed by dogs in the deep drifts of the winter of 1922-3, deer were present in at least usual numbers, some sections reporting a distinct increase, deer in new localities, and unusual numbers of fawns. Deer shot while damaging crops numbered 109; and towns were reimbursed by the commonwealth for claims paid for damage by deer to the amount of \$5,811.65.

Moose. — Moose have not made themselves conspicuous in any way during the year. They are not increasing noticeably, though a few calves are known to have been born. They are seen from time to time, but there were no complaints of damage, and no compensation claimed.

Squirrels. — It is difficult to know what is taking place among the gray squirrels. Reports vary widely. It is reasonable to suppose, however, that they have been driven from the chestnut woods by the death of their host trees and have taken to the scrub oak sections and to scattered clumps of hickory along the roadsides and in the open. In their search for food they are venturing more and more into orchards and residential sections. Thus they are more commonly seen, and probably the reported increases are more apparent than real.

Hares and Rabbits. — Over a large part of the State the native rabbits have maintained their numbers well. In northeastern Massachusetts, however, and in the west-central section a scarcity was noted. It is gratifying to have reported a good breeding season for white hares in some localities.

Fur-bearing Animals. — Chapter 185, Acts of 1923 provided that reports should be made to this Division of fur-bearing animals trapped or killed, from which value or profit is obtained. The returns for 1923 show: Number of reports, 644; muskrat, 9,128; mink, 983; skunk, 3,334; fox, 1,200; raccoon, 655; squirrel, 94; weasel, 109; otter, 18; total, 15,521.

It is apparent that the fur-bearing animals have not re-established themselves after the excessive trapping during the period of high prices a few years ago. There are large areas in the State which, if properly protected and conserva-

tively trapped, should yield substantial returns in fur, and we believe a close season for a year or two on muskrats would be very beneficial. There are some localities where the muskrat must be eliminated or reduced to small numbers, particularly on the Cape, where large dikes on cranberry bogs are maintained. But it is safe to say that additional protection for a couple of years would do much to build up an asset of value without corresponding injury to other wild life.

Up to the present time public sentiment has refused to give the fox protection during the breeding season. Despite this lack, it is increasing. It is to be regretted that the number of fox hunters in the State is not larger, especially those who own and hunt their own dogs. We have always emphasized the economic value of the fox, while at the same time admitting the destructiveness of certain individuals. If it were hunted and trapped more it would afford some of the finest sport to be had in the field, and a large fox-hunting fraternity might be one of the best guarantees to the public that the species would be kept within reasonable numbers if given the same protection extended to other furbearers.

ENEMIES TO GAME.

Starlings continue to increase and are seen in large flocks. In some sections they appear to do little harm; but in others complaints are heard of damage in the grain fields. In towns and cities they are replacing the robins. The increase is unchecked, as there is no incentive for gunners to spend ammunition on them.

Bounties of \$5 each were paid on 52 wild cat, Canada lynx or loupcervier under Section 90, Chapter 131, General Laws. They are increasing throughout all New England, and already presenting a great problem with respect to white hares and deer. They are difficult to hunt and trap, and doubtless before long it will be necessary to offer a bounty sufficiently large to insure their systematic reduction.

The hunting house cat still continues to be one of the greatest destructive factors to wild life, and the number is steadily increasing.

There has been no appreciable increase of any species of the hawks or owls classed as vermin.

There was some agitation from certain quarters over alleged destruction of trout by black-crowned night herons and great blue herons at hatcheries and along trout streams, and the large herons are charged with the destruction of large numbers of fingerlings when the brooks are low. The issuance of Federal permits to shoot them, where necessary, was suggested as a remedy. It is true that they are present in large numbers where fish are to be found, and there is plenty of evidence that they do feed on trout; yet it is still unproved whether their main food is trout, or whether they feed also on minnows, herring and less valuable species, for no systematic investigations have been conducted to determine the facts. Plans are being made with the Biological Survey for a study of the stomach contents of some of these herons.

RESERVATIONS.

Martha's Vineyard Reservation.

The expiration of the lease of the portion of the reservation which the commonwealth does not own brought up the question of its renewal. In this connection it seemed advisable to pause and consider the status of the heath hen, both as to what had been accomplished in the past, and what appeared to be its future. In surveying the situation the following facts appeared —

The heath hen had been given special protection by the State since 1907. A sanctuary of 1,864 acres (564 State-owned and 1,300 leased) had been maintained, located on and around the area chosen by the heath hen as their last stand. It included both the typical scrub oak country of Marthas Vineyard and extensive areas of grassland, and sufficient land was cultivated each year to provide standing feed for the birds in winter and green food at other seasons. A resident caretaker was in charge who carefully patrolled the reservation against vermin, and illegal shooting was practically nil. In short, the aim had

been to maintain conditions that would be as nearly ideal for the heath hen as possible. Varying sums, running as high as \$5,000 in 1914 and thereafter an average of about \$4,000 yearly, had been expended by the State, totalling up to the beginning of 1923, \$48,185.54.

What had been the result of this 15 years of care? When the reservation was started in 1907 it was estimated that there were from 75 to 100 heath hens left on the island. Since that time they had increased with wide fluctuations. Estimates of their numbers had run, in some years, as high as 2,000. For a period of years following a very destructive forest fire in 1916 they had gradually increased and then decreased, until in January, 1923, at the time of this review, it was estimated that there were not more than 150 heath hens on the island. (This estimate, however, was too high, as proved by the spring census a couple of months later). This despite the fact that in recent years there had been no disastrous fires or excessive visitations of vermin, and conditions had been maintained on the reservation as above. During the last few years, since the birds had become scarce, yearly counts have been made either by the State Ornithologist or our agents, each spring, by visiting the known haunts of the birds and counting the number of individuals in sight when they are in the open for their mating antics. While such a census is by no means complete, it gives a basis for estimate. In 1917 the count was 126; in 1918, 155; in 1919, 165; in 1920, no census, as bad weather kept the birds under cover; in 1921, 314; in 1922, 117; and through the winter of 1922-3 they had been unusually scarce.

With the above facts before them, the fish and game officials were obliged to face the question whether the citizens of the commonwealth, whose interests they represent and whose money they disburse, would consider it justifiable to continue to invest several thousand dollars yearly of the public funds in what was apparently a losing cause, when the same amount, used in other ways, would stock the island with other varieties of game, from which perhaps a greater portion of the tax-paying public would derive benefit and pleasure. In order to guard against the introduction of disease among the heath hen no game birds (except quail) had been liberated on the island since the establishment of the reservation.

Following the established policy of taking the public into our confidence and asking advice and suggestions when crises of this sort arise, a statement of facts was prepared, and a questionnaire, setting forth a number of possible courses. These were sent to about 100 persons, including the original subscribers to the heath hen fund, the local town governments, sportsmen, conservationists, the State ornithologist, the State and National Audubon Societies, the American Ornithologists' Union, as well as some of the foremost ornithologists of the entire country. The propositions submitted to them were:—

1. Shall the lease of the Cromwell property be discontinued and that portion of the reservation given up?
2. Shall the State-owned land of 564 acres be continued as a heath hen reservation as in the past, with the addition of a limited amount of pheasant breeding for stocking Martha's Vineyard and Nantucket?
3. Or, shall the protection of the heath hen be abandoned and the island stocked with quail and pheasants to provide upland game shooting, so far as unposted land will permit? (This being done after specimens of the heath hen have been prepared and deposited in museums to preserve them for science).
4. Or, shall we do all possible to keep the reservation as attractive as possible for the heath hen, to preserve them as long as possible?
5. Would you advise a general conference to be held at the State House, to discuss these questions?

Sixty-five replies were received, 49 favoring continued protection and 16 taking the contrary view.

Various suggestions were received, but practically all were already in operation. The proposal for an intensive biological study of the heath hen could not be adopted for financial reasons, but Dr. John C. Phillips of Wenham and

others came forward with an offer to finance such a study. Prof. Alfred O. Gross of Bowdoin College, Brunswick, Me., was selected and went to the island in April, spending much time on the ground during the spring and summer and returning at intervals during the remainder of the year. His report will not be made until a full year's observations have been recorded, and the future policy of the Division will be determined to some extent by his findings and recommendations. Meantime, with sentiment so overwhelmingly in favor of protection, the lease was renewed for another year, the reservation continued as in the past, and all interested persons so notified.

Following is the reservation report for the year:

The usual patrol work and the hunting of vermin occupied the winter months. The unusually severe winter which prevailed over the State did not extend to Martha's Vineyard, and feeding of quail and heath hen was necessary on only a few occasions. Spring work, consisting of the planting of crops for birds and live stock, along with the repairing of roads, progressed as usual.

The spring census of 1923 gave 46 birds on May 3 by actual count.

The weather conditions in the breeding season were very good. The superintendent saw 2 broods of heath hen and heard of another, 11 chicks all told. Though a careful watch was kept during the time the birds were in the open, very few females were observed and the inference is that the greater proportion of the surviving birds are males. But 5 heath hens have been seen on the reservation since early summer to the time of this report, and reports from farmers and others on bordering farms account for about 30 more.

Very many visitors called at the reservation during the spring and summer as a direct result of the publicity given by the press to the investigation in progress. No fires occurred to affect the heath hen. The total kill of vermin was 15 wood cats, 211 rats, and 8 hawks.

Myles Standish State Forest.

Good progress was made in improving the condition of the roads and fire-stops. Wild life is increasing in spite of the constant struggle which must be maintained against vermin, and deer are becoming a serious menace to the young trees.

There were 150 pheasants raised, 100 of which were liberated on the reservation. The forest has been patrolled when it appeared necessary and in connection with other work. There were no violations of law.

Sharon Reservation — Moose Hill Bird Sanctuary.

The conduct of the reservation proceeded on usual lines. Through the continued co-operation of nearby owners over 600 acres of land, including two ponds suitable for wild fowl, have, during the past year, been added to the protected area which is now more than 1,500 acres. This land is thoroughly posted and patrolled, and a general observance of the game laws has been evident.

The value of the co-ordinating work of the Massachusetts Audubon Society in the ownership and maintenance of the Moose Hill Bird Sanctuary near the center of this area can hardly be over-estimated. The improvements in the new headquarters; the making of new trails about the grounds; the valuable exhibits and library of information here maintained, and the setting out of shrubs and trees to attract and shelter the birds, — as well as the efforts to re-establish and protect vanishing wild flowers, — all are part of a general plan which is being carried out for a permanent sanctuary for all wild life. Through continued daily feeding many birds are in evidence about the sanctuary grounds throughout the year, thus rendering the opportunities for study and observation more and more valuable as the years go by. The public is showing a constantly increasing appreciation of these benefits, — evidenced by the increasing numbers of intelligent, interested visitors, totalling during the past year about 5,000. Banding of birds was carried on as usual for the U. S. Biological Survey.

Reservation under Sections 69-75, Ch. 131, Gen. Laws.

Within the period of this report the terms for which the following reservations were made, expired, and no petitions were received for renewal: Pittsfield Reservation expired Jan. 16; Hubbardston Reservation, Apr. 14; and Sconticut Neck Reservation Fairhaven, Nov. 6.

A new reservation, known as the Harvard Forest Reservation, was established in Petersham for 5 years from Feb. 15, 1923. This land, about 700 acres, is owned by Harvard College and has been set aside as a preserve because of the wonderful variation in its woodlands, its sightly locations and the unspoiled natural conditions. In order that the wild life in this forest may be likewise preserved it has been placed under the protection of this Division.

To the reservation in Boxford was added, by gift of Dr. John C. Phillips of Wenham who deeded the land to the Commonwealth last year, an additional 3 acres which makes it a solid tract.

INLAND FISHERIES.

GENERAL.

This year marks an epoch in the history of our inland fisheries, for the prohibition of the sale of fresh-water fish taken in Massachusetts puts an end to the commercialization of our fresh-water fisheries, in the same way that in 1912 the sale of game killed in the State was stopped. The already existing protective measures (length, bag and seasonal limits) were improved by the placing of a closed season and catch limit on pike perch; closed season on horned pout and yellow perch; length limit for rainbow and brown trout; making permanent the 12-inch limit on pickerel; and changing the catch limit for white perch from a weight to a numerical basis. Now, for the first time, Massachusetts can claim a code of laws which gives at least a reasonable protection to its greatly abused fisheries. It will be many years before the rehabilitation of the fisheries is accomplished, but with the incentive to fish for market removed and with both natural and artificial stocking proceeding, the outlook for the future is more promising than could be said before.

TROUT.

In the section extending from the coast westward through Worcester County the early season for trout fishing was, on the whole, disappointing, being very dry, with low water and small catches. Essex County escaped the drought, water and weather conditions being favorable and fishing good. In the west-central, hilly section the season fell below standard, for the cold weather early in the season and the low water at the end, was unfavorable to the fishermen. The Berkshire section fared best. Though the season opened late on account of a very cold spring, with high water and low temperature, as the weather warmed up fishing improved and the trout ran well as to size. In summer all over the state streams became very low and many dried up early in June, but heavy rains improved conditions somewhat by August, after which again extreme dryness prevailed until October, drying up the smaller streams completely and bringing the larger ones very low.

Concerning brown trout there is nothing new to report. The usual number of good catches were made. We are continuing the effort to build up a brood stock of brown trout at the Palmer Hatchery, but as practically all the hatch of 1922 was lost, progress is slow at present. (See "Fish and Game Distribution"). Legislation this year set the legal length of brown trout at eight inches.

CHINOOK SALMON.

So far as could be learned no Chinook salmon were taken in either Long Pond, Plymouth, Cliff Pond, Brewster or Peters Pond, Sandwich. In Long Pond the white perch, bass and smelt which were previously numerous have also disappeared. This is laid by popular belief to the salmon. The question is before us what line to follow in the future development of this pond. On the one hand, a certain element urges the introduction of salmon fingerlings each year to

produce the 1 to 2-lb. fish that have afforded them good sport in fishing with a light fly rod and live shrimp. Land owners around the pond, on the other hand, oppose the salmon as detrimental to bass and white perch and favor the restoration of the latter fisheries.

PIKE PERCH.

The pike perch has proved to be, like the Chinook salmon, one of those species which has established itself in only a very small percentage of the waters into which introduced. Though many apparently favorable ponds were liberally stocked with fry over a period of ten years, it has been almost without result. A review of the fishing season of 1923 shows that good catches were made in Massapoag Lake, Sharon, which is about the only pond successfully stocked. This has consistently yielded good catches for a number of years, and fishermen frequently return more than their catch limit to the waters. In some waters which have yielded fair catches the fishing has fallen off to practically no catch. In the Connecticut River pike perch were taken only occasionally. In the Deerfield River fishing was not as good as some years. Our recommendation in 1922 for protection was adopted, and the catch limit of 5 in one day, 12-inch length limit, and closed season from February 1 to April 30 should permit a better natural increase. No plantings of pike perch were made in 1923, this expensive work being discontinued, at least for the present.

PICKEREL AND PIKE.

Though large pickerel are still taken quite commonly in the State, it occurs in particular places and is not the prevailing condition. Many sections are reporting that the pickerel are running small in size and decreasing in numbers. This is not surprising and is the natural result of a long period of excessive fishing, particularly winter fishing, with no replacement by artificial propagation. We can only renew our statement of previous years, that until some restriction is placed on the amount of winter fishing, the pickerel fishing in our ponds will continue to decline. The summer drought, which brought the ponds and brooks unusually low, doubtless worked much harm for it made possible the taking of quantities of the large breeders. In some places fish were stranded and died by reason of the drying up of the rivers and ponds. The Connecticut River and the Oxbow at Mt. Tom yielded good catches of pike, several being taken weighing in the neighborhood of 15 pounds.

BASS.

There were no unusual features to the bass season this year. Certain waters yield good catches. There appears to be an increasing demand for large mouth bass. It is not possible to propagate these by the usual hatchery methods, but we hope to produce them by the brood-pond method, now being developed, and by capture of fry in such places as water supply ponds. It is our aim and object to develop bass fishing in suitable ponds as fast as circumstances permit.

WHITE PERCH.

The stocking of the ponds of the State with white perch is continuing from year to year as a routine matter, and that it is not fruitless is proved by the fact that each year they begin to appear in a few of the ponds in which stock has been planted. For account of the salvage work, see "Fish and Game Distribution."

SMELT.

Smelt work was limited to patrol of the only remaining spawning grounds of any importance on our coast, the Mill River and the Parker River on the North Shore, and the streams around Weymouth on the South Shore.

The run in all the coastal streams was very poor, even in the Weir River, Hingham, and in the Weymouth Fore and Back Rivers, Weymouth. It was difficult to find any spawn except in the Weir River, and there, being deposited on flood water, much went to waste. In the Mill River and in the Parker River,

there were heavy runs and deposits of spawn for a few nights, and it is probable that there was a fair hatch.

At Laurel Lake, Lee, and Onota Lake, Pittsfield, many people were on hand to secure the allotment of fresh-water smelt permitted under the Division's regulations, but the smelt were scarce. This reduction in numbers is in accord with the wishes of the local fishermen, who believe the lakes are over-supplied with bait fish.

HORNED POUT AND CATFISH.

Field reports show that, while certain favorable waters yielded the usual good catches, for the State as a whole it is indisputably true that the horned pout are running small in size and fewer in numbers. The drying off of small, isolated ponds during the protracted drought resulted in heavy losses to the fish life and permitted an undue amount of adult stock to be taken, the effect of which will be apparent in the future. Several years ago we started to build up the stocks in the State, but the ponds are so many and our resources so small, that results cannot be expected for some years. The provision made by the last Legislature for a catch limit on horned pout of 40 in one day, and a closed season from March 1 to June 14, should in time help along the rehabilitation of the species.

It is too soon to expect very definite results from the planting of catfish in 1920 and 1922, though a few are beginning to show in the Connecticut River and one of the stocked ponds. A number of the catfish were caught out shortly after being planted, and before they had had a chance to breed.

BLUEGILL, CALICO BASS, LONG-EARED SUNFISH.

Bluegill sunfish for distribution were taken in salvage from General Butler Ames' Pond in Tewksbury and from the Stockwell Pond unit, and a limited number of Calico Bass and Long-eared sunfish from the former. It will be some years, however, before results of plantings will appear.

ICE FISHING.

Ice fishing was carried on to a less extent than for many winters. The season opened well with fair catches up to about the first of January. From that time on there was continuous cold weather, and heavy ice formed, making it difficult to cut holes, and the deep snow, which held all through the winter, made travel difficult and the ponds practically inaccessible. While it is possible that a very severe winter may automatically provide a closed season, in some sections of the state this is not true, especially in the eastern and the Cape Cod districts. The situation should not be left to chance, but some limitation should be made in the period of winter fishing.

PONDS.

Public Rights.

There is a growing demand by the public for rights of way to the great ponds, and the question arises every year with reference to some particular pond. The matter will never be settled until there is further legislation, but as bearing on it the Attorney General recently handed down an opinion, of which his summary of conclusions follows:—

1. Great ponds are ponds created by the natural formation of the land at a particular place, containing, in their natural condition, more than ten acres.
2. Title to great ponds which had not before the year 1647 been granted to a town or been appropriated to private persons is in the Commonwealth for the benefit of the public.
3. Public rights in great ponds which are not appropriated to private persons are not limited to those mentioned in the Colonial Ordinances. Such ponds are devoted to such public uses as the progress of civilization and the increasing wants of the community properly demand.
4. The public rights are common to all persons.
5. Except during the period from 1835 to 1867 prescriptive rights in great ponds could not be acquired against the Commonwealth.

6. The Commonwealth and the public may acquire prescriptive rights in ponds which are privately owned.

7. The control of great ponds is in the Legislature, which may regulate and change the public rights or take them away altogether.

8. There is now no public right to fish in ponds containing twenty acres or less where such ponds are entirely surrounded by land of private riparian owners, or where the surrounding land is owned by private persons and the Commonwealth or a county, city or town, and compensation has been paid by the private owners in accordance with the statutory provisions.

9. The other public rights in great ponds, whether more or less than twenty acres in area, are not affected by the statute relative to fishing and exist in full force, except as they have otherwise been restricted by the Legislature.

10. In ponds containing more than twenty acres in area, the public, in addition to such rights as it had in the pond itself, has a right to reasonable means of access to such ponds for the purpose of fishing.

11. In exercising the foregoing right the public may, where there are no means of access over unimproved and unenclosed land and no public lands or public roads or rights of way, pass in a reasonable manner over other lands of proprietors bordering on such ponds.

12. The public, in order to gain access to great ponds for the purpose of exercising the right of fowling, and possibly some other rights which reasonably may be supposed to have been contemplated at the time of the adoption of the Colonial Ordinance may, where there are no public lands, public roads or rights of way, pass and repass on foot over unimproved and unenclosed lands without rendering themselves liable as trespassers.

Ponds Stocked and Closed.

The following ponds were stocked under Section 28, Chapter 130, General Laws, and closed to winter fishing by regulations which in all cases expire November 1, 1926: Warner Pond, Greenwich; Curtis Pond, Greenwich; Winnecunnet Pond, Norton; Little Alum Pond, Brimfield; Fort Pond, Littleton. The regulations close the ponds to all fishing except between May 30 and October 31, inclusive, of each year, and the tributary streams are closed except between April 15 and July 31, inclusive. Fishing is allowed only with a hand line and single hook, or with a single hook and line attached to a rod or pole held in the hand.

Privately-owned Ponds Stocked.

The following privately-owned ponds were stocked with food fish on stipulation of the riparian proprietors that they will permit public fishing therein for a specified term of years: Neponset Reservoir, public fishing permitted to December 19, 1932, except from Dec. 1 to Apr. 30 of each year; Bartlett's Pond, Leominster, fishing permitted to May 25, 1933; Carver's Pond, Bridgewater, fishing permitted to May 25, 1933.

The following privately-owned ponds were stocked on written agreement by the owners to permit the Division in future to take an equal amount of stock from the resulting increase: Pond of John S. Lawrence, Topsfield, black bass; Pond of Herbert R. Wolcott, Springfield, horned pout.

FISHWAYS.

The opening up of the alewife streams by the installation of fishways is proceeding year by year, as fast as other activities will permit, and will continue until all the principal streams are open from headwaters to sea. The object is to produce in our coastal waters a quantity of young alewives which will provide a food supply, and thereby attract the other migratory fishes which furnish human food, and to insure passage for other species which we know use the ways. In most instances the dam owners offer their co-operation, though there are still some who are unable to appreciate the necessity of this work and the value of these fisheries.

During the run of alewives and other anadromous fish the functioning of all existing fishways was carefully observed, and during the year the preliminary

work looking to the installation of new ones was pursued. Present efforts are directed to the opening of the Ipswich, the Saugus and the Parker Rivers.

A considerable amount of experimental work was done towards inventing an automatic device for the regulation of the flow of water through the various fishways, — still in the experimental stage.

Ipswich River.

Ipswich Mills. — Frequent observations failed to disclose any alewives in the river at the Ipswich Mills fishway; but even if present it is doubtful if they could have surmounted this fishway, owing to the high drop between the lowest compartment and low water level (due to high water in the spring). This condition has existed since the completion of this fishway in 1921. On July 11 negotiations were re-opened with the owners, and they were asked to construct an additional compartment to the then existing fishway. They complied most willingly. The work was completed early in September according to plans furnished by this Division, and it is believed that there is now an adequate construction to pass the fish over the first obstruction on the Ipswich River, nearest the sea.

Norwood Mills. — Plans and specifications for a fishway were submitted early in 1922, but no action has been taken by the owners towards complying. They have indicated a willingness to co-operate to install a fishway, but not of the type recommended. Installation has not been insisted upon up to this time on account of the non-completion of the Ipswich Mills fishway. With that now in working condition it is in order to proceed with the next two obstructions.

Willowdale Dam. — Plans and specifications for a fishway were submitted early in 1922; but the owner objected to building it on the ground that there were obstructions below his dam, namely, at the Norwood and Ipswich Mills. This case will be taken up in its proper order as the opening of the river proceeds.

Saugus River.

Wallace Nutting Dam. — The plans and specifications for a fishway at the dam of this company are nearly completed.

Prankers Pond Fishway. — The Prankers Pond fishway has been repaired, and, while it was in working condition when examined, it does not look good for any length of service.

Parker River.

Byfield Woolen Co. — As a result of our action in submitting plans and specifications for a fishway to the Byfield Woolen Co., the companies representing all of the obstructions on the river have asked that a conference be arranged at which the matter of fishways on the whole system may be considered at one time.

Merrimack River.

As it is of particular interest to know what takes place in the Merrimack River (so polluted that it was predicted no fish could live in it), now that the spawning grounds have been made accessible by fishways, a special observer was on duty at each fishway during the period when anadromous fish were passing up. High water in the spring and low water in the summer curtailed the period during which the ways could be kept open.

Lawrence Fishway. — The fishway at Lawrence was kept open between May 9 and June 30, during which time it was recorded that the following passed through, — 3,943 alewives, 1,717 shiners, 21 carp, and 651 miscellaneous fish. The number of different species using it this season showed a decided increase over the preceding year.

Lowell Fishway. — At Lowell alewives first appeared on May 18, about a week earlier than last year, and ran up to June 13. At Lawrence they were first seen passing through the fishway on May 16, an interval of about 3 days before they reached the fishway at Lowell. In 1922 an interval of 9 days marked their passage up the river. Observations were made twice daily, and from May 11 to June 25 there were recorded as having passed through the fishway, 910 alewives and 166 shiners and dace.

Paskamansett River.

The fishway installed last year at Russells Mills, South Dartmouth, was inspected periodically, and considerable time spent in adjusting the flashboards and regulating the flow of water. A few alewives were seen in the fishway.

Barker's River.

Results at the fishway installed in 1922 by F. L. Snow at Pembroke justified our belief that it would prove a very practical fishway, for on May 6 there were counted 850 alewives in one hour, and on the 26th an inspection showed 25 to 40 alewives passed the head of the fishway in one minute. The bog owners in this locality, as well as the selectmen, are co-operating in every way to restore this fishery.

Taunton, Town, Satucket and Nemasket Rivers; Red Brook, Wareham and Plymouth, and Herring River, Bournedale.

All the fishways on these rivers were in operation; observations were made periodically, and in most instances the ways were found to be operating effectively and a variety of fish surmounting in fair numbers. We are trying to hasten the restoration of the alewife fisheries of the Taunton River system by making yearly plants of mature alewives (for account of which, see "Alewives").

Easton Investment Co.—This is the first year that the fishway at the old Ames dam on the Town River at West Bridgewater, completed in November, 1922, has been in operation. Periodical examinations showed it to be working very effectively, with the right amount of water passing through, and with a gradual surmounting to be made by the fish.

Hanson Cedar Co.—In the course of reclaiming and transforming into cranberry bogs some hundreds of acres of swamp and pond in Halifax and Hanson, a dam was constructed below Monponsett Pond, for flowage purposes. This would bar alewives from Robbins Pond (the headwaters of the Taunton River), which has recently been opened its entire length by installation of fishways. A conference between officials of the company and this division resulted in the construction of a concrete fishway consisting of a 2x2x15 ft. trough with 6-inch steps at intervals of 3 ft. When examined this spring it was functioning properly, though no fish were seen at the time.

POLLUTION.

Such cases of pollution of fishing waters as came to our attention were handled along with the regular routine of business.

Shellfish in Polluted Areas.

Areas in Boston and Cohasset Harbors polluted by sewage were closed to the taking of shellfish. (See "Mollusk Fisheries.")

Oil Pollution.

Through the winter of 1922-3 large numbers of water fowl perished through contact with oil. Nantucket waters were badly polluted, and numbers of dead birds picked up daily. At Nantasket the unloading of crude oil into the harbor caused the destruction of about a thousand ducks. Conditions off Chatham are pictured in a letter from the Monomoy lighthouse keeper dated January 24:

"There are fully two to three thousand eider ducks in this vicinity, and I doubt very much indeed if there will be very many, if any, left to return to their native breeding ground in the north. I rode about 3 miles up the beach, north, this morning, and it was as much as I could do to keep clear of the ducks running over the beach to the tall beach grass where they go and hide, and in the end die; for they cannot fly on account of the oil. I do not know what results would be if one undertook to walk from Chatham to this light along the beach, but I have every reason to believe that a good-sized team would be needed to put the dead and dying in. I assure you, I cannot express the condition of these birds on paper; and though I have a very good glass here, I have failed to find one duck that is clear of the oil."

The destruction which threatens our shellfisheries, shore fisheries and water fowl through pollution of coastal waters by discharges of oil from oil-burning steamers, has been discussed in other reports. State law does not reach these cases, the pollution occurring largely outside the three-mile limit. Definite remedial measures, however, are under way. In August, 1922, the National Coast Anti-Pollution League was formed under the sponsorship of the New Jersey State League of Municipalities, composed of state and municipal officials and civic representatives from the coast states and cities. That organization supported a bill in Congress, the so-called Freylinghuysen-Appleby Anti-Pollution Bill, which failed of passage by a narrow margin. A joint Congressional Resolution authorized the Secretary of State to call an international conference on oil pollution. An Interdepartmental Committee was formed to prepare necessary data, and the U. S. Bureau of Mines completed a survey of pollution on the entire coast, co-operating with the American Petroleum Institution and the American Steamship Owners' Association. To plan a further campaign a second conference was held at Atlantic City in October of 1923, attended by government officials, port authorities, chambers of commerce, and similar bodies. Though not in attendance at the meeting, the director of this division was elected to membership on the Executive Committee.

PROPAGATION OF FISH AND GAME.

FISH HATCHERIES AND GAME FARMS.

At three hatcheries, Sutton, Amherst and Montague, the disease appeared known as *Furunculosis* or fish septicemia, — in fingerlings only at the former, and in fingerlings and yearlings at the two latter. The disease is not likely to cause any great loss of fish at any of these stations, owing to the low temperature of the water. If past observations are to be relied upon, it will never take the epidemic form, though it is conceivable that under certain weather conditions, poor quality of fish, crowded pools, or special strains of the invading organism, an epidemic might result. The possibility is very remote, however. A thorough sterilization was made at the end of the season of all the pools in which the fish had shown evidence of the disease.

The results of the year in the production of fish and game were very satisfactory, both as to amount and quality of product, with some improvement in the point of cost. For some time we have realized that an efficient operation of fish hatcheries and game farms is not attained in the mere production of a large amount of stock, but lies in doing it at a reasonable figure. That is to say, the production costs should not be disproportionate to the market value of the output.

Palmer Fish Hatchery.

Construction and improvement work was confined to improvements and additions to trout pools, painting the tenement house, and grading.

Small-mouth Black Bass. — The hatching and rearing of small-mouth black bass was carried on in the usual way. Experimental work is under way (successful this year, but to be repeated before permanent adoption) to make it possible to send out fry of a larger size. There were distributed 131,000 fry (one-inch), 30,000 two-inch and 38,335 three-inch fingerlings.

Brook Trout. — The eggs for hatching comprised 100,000 eyed eggs from the Sandwich Hatchery, 19,000 from the wild stock at the station and 500,000 purchased. There were hatched and distributed the following — 66,400 fry to the Sutton Hatchery and 186,000 fry to the Amherst Rearing Station; 59,000 fingerlings to the Sutton Hatchery and 41,100 fingerlings to the Amherst Rearing Station, and a general distribution to public waters of 120,245 fingerlings (80,000 three-inch, 40,590 four-inch) and 12 yearlings.

Brown Trout. — There were 201,000 brown trout eggs purchased which yielded 194,703 fry, from which 40,225 fingerlings were reared. Losses were large as the fry would not, at first, take liver as food, and the natural food in the water was insufficient. There were 39,225 distributed as 3½-inch finger-

lings, and 1,000 held to be reared for breeders. This is the second year of rearing of brown trout fingerlings at Palmer. The New York Conservation Commission contributed 520 fingerlings which were added to the brood stock.

Horned Pout.—No great attention was given to rearing horned pout at Palmer. The water supply and shiner ponds yielded 44,000 fingerlings, which were distributed along with the approximately 100,000 fingerlings purchased from private sources and handled from Palmer as a distributing center (80,000 2½-inch and 64,000 4-inch).

Blue Gills and Yellow Perch.—Distribution was made of 3,575 blue gills (2½ inch) reared the previous year and held in the ponds over winter, and 4,000 (3½ inch) yellow perch fingerlings collected from the shiner pond.

Amherst Rearing Station.

Development work was continued throughout the year, including construction of shipping stand, permanent camp, improvement of existing ponds, construction of new ones, and re-arrangements for the better utilization of the water supply. The development work has called for only a moderate annual expenditure, but has been fruitful of results.

The opening of the station was delayed as long as possible on account of the great depth of snow, and work was started February 26 to prepare the station to receive stock. This consisted of 186,000 fry and 41,100 fingerlings from Palmer; 25,000 fry from Sandwich; 204,400 fry from Montague,—all of satisfactory quality except one shipment of about 25,000 late fry. This amount did not fill the ponds, and part of the unusual room was utilized for 1,610 yearlings shipped in from Montague. The condition and growth of the fingerling stock was good through the season, except lots infected by disease. As usual the early growth was slow, but after midsummer rapid and vigorous. This appears to be a fixed condition at this station, and in two respects adds to its value, for the fish make their growth on a food consumption that is well below the average, and at distribution are hardier than are fish in which early growth is rapid and then checked. Distributions totalled 235,000 fingerlings (180,000 three-inch, 35,000 three and a half inch, and 20,000 four-inch), and 1,000 of the yearlings received from Montague.

Montague Rearing Station.

Construction work was largely limited to permanent items, including concrete bridges, water supply for shipping, and completion of the ice house building, workshop and storage. Improvement work included some extension of facilities for feeding early fry, by digging out pools among the springs, and improving the older pools by enlarging and deepening in the clean-out work.

It was an excellent year for production. The egg-stock consisted of 1,000,000 from commercial dealers, and 100,000 from the station brood stock. The increased hatching capacity made it possible to carry enough eggs to fully supply the station, and in addition to supply 204,400 fry to Amherst. To relieve the station and use available space elsewhere, 1,610 of the yearlings were transferred to Amherst. There were sent out on general distribution 3,160 yearlings. The hatching and rearing work progressed normally, and the year's output of fingerlings was 387,500 for general distribution (258,300 three-inch, 60,000 three and a half inch, and 69,200 four-inch), and 1,000 fingerlings held for brood stock.

Sandwich Fish Hatcheries.

At the Sandwich plant repairs were made on a number of the cement ponds, and several new wells driven to replace old ones. At East Sandwich the hatchery building was enlarged, four old pools replaced, and filling and grading done.

A supply of 1,360,000 eggs was taken from the brood stock. The season was unusually successful, with no set-backs of any kind. Distributions were as follows:

Palmer Hatchery (eyed eggs), 100,000.

Sutton Hatchery (1 to 1¼ inch), 196,000.

Amherst Rearing Station (1 to 1¼ inch), 25,000.

Worcester Fish and Game Association (1 to 1¼ inch), 60,000.

Canton Rearing Station (1 to 1¼ inch), 25,000.

To public waters (250,000 three-inch, 100,000 three and a half inch, and 88,912 four-inch), 438,912.

Retained at hatchery for brood stock, 10,000.

During the season distributed to public waters (adults), 2,899.

Sutton Hatchery.

At the Sutton Hatchery improvement work was carried on more or less continuously throughout the year, and at some periods was the chief occupation. It included rather extensive repairs to the buildings, painting, repairs to salvage equipment, fitting and storage of the camp to be set up at Amherst, repairs and alterations to the ponds and water supplies, and improvements to the grounds.

For rearing there were received 196,000 fry from Sandwich and 66,400 fry and 59,000 fingerlings from Palmer. Some of the earliest shipments were not of the best quality, unfit for long transportation and transfer to ponds under the very wintry conditions, and not less than 40,000 were lost directly after arrival. All other fish received were satisfactory and did well throughout the growing season. Distributions to public waters totalled 194,774 fingerlings (75,000 three inch, 75,000 three and one-half inch, and 44,774 four inch fish).

Marshfield Bird Farm.

The barn on the land purchased last year was remodelled into a grain room, and mixer installed. There were no few features in the rearing work. From the adult stock of the station there were contributed 131 pheasants to form the special flock of egg-producers at Wilbraham to provide eggs for distribution. (See Fish and Game Distribution). The station brood stock of 454 pheasants produced 13,242 eggs collected and set, of which 7,869 hatched. There were reared and liberated 3,828 young pheasants (with 434 on hand at the end of the year). There were liberated 210 adults. The bulk of the distributions were made by truck.

Sandwich Bird Farm.

The Sandwich Bird Farm is now conducted as a pheasant producing plant, with wood ducks and quail handled on a very small scale in continuance of breeding experiments. The work of remodelling the station was continued, completing ten 10x16-ft. brooder houses with connecting pens and hot-water brooder system. The partly constructed cement incubator cellar was usable to some extent, and has since been completed with grain and storage rooms, workshop and office above it.

Pheasants. — The brood stock at the beginning of the laying season numbered 381 from which 11,121 eggs were collected and set, with a hatch of 5,635 chicks. From these were raised 2,074 of which 1,722 were distributed in the covers, 152 added to the brood stock, and 200 late-hatched birds held over winter. Twenty-five of this year's early hatched cocks were purchased and added to the brood stock to change the blood lines. Before the breeding season 26 adults were distributed, and during the fall 32 more adults.

Wood Ducks. — Breeding birds on hand at the beginning of the season, 39; eggs collected, 133; hatched, 79; reared, 69; killed accidentally and lost, 14; distributed, 1 adult and 57 young; on hand, 8.

Quail. — From a stock of 32 adults about 50 young were raised with bantams; 20 distributed; 30 on hand. Three adults sent out for experimental purposes. The 22 quail that survived from the shipment from Arkansas were liberated on Martha's Vineyard.

Wilbraham Game Farm.

At the Wilbraham Game Farm rearing facilities were increased by the construction of five 10x20-ft. brooder houses, the replacement of temporary yards with ten permanent ones (20x48-ft.), and the addition of 3 incubators and 5 coal-heated brooders.

This station was made the headquarters for the production and distribution of the egg-stock. Towards this 176 adults were contributed. (See Fish and Game Distribution).

Brood stock numbered 450 birds, from which 18,226 eggs were collected. There were set in incubators 17,963, and 8,775 hatched. All of the usual difficulties were experienced during the rearing season, some being overcome, and others still a problem. The dry, hot weather in the time of flight of the rose chafer was responsible for more damages than usual from this source. Eggs collected during the extremely hot period resulted in some very poor hatches. From the chicks hatched 3,816 were reared to distribution age and liberated, 275 retained for brood stock, and 386 held for later distribution. Sixty adults, not part of the egg stock, were liberated at the beginning of the breeding season.

Myles Standish State Forest Reservation.

On the Myles Standish State Forest (see Reservations) 150 pheasants were raised, of which 100 were liberated.

FIELD PROPAGATION.

Pond Cultural Methods.

Past efforts in fish culture have been concentrated chiefly on production of brook trout and the re-stocking of brooks. The need of giving similar attention to the ponds has been recognized, and it is not intended to expand the work at the trout hatcheries materially beyond its present volume. Work for the production of pond fish is already under way. Probably this can best be accomplished (as most pond fish do not respond to hatchery methods) by securing control of suitable ponds, stocking them with breeders of the desired species, and distributing the yearly increase. Following is the report of accomplishments thus far.

Shaker Mill Pond.—All necessary repairs and construction having been completed in 1922, no work, aside from frequent inspection, was done during the first four months of 1923. A good body of water was held throughout the winter and the fish apparently came through in excellent condition. Although the summer's unprecedented drought completely dried the inlet stream, it was possible to conserve a sufficient supply of water to sustain the fish without apparent loss, although it is very possible that the congestion, caused by the prolonged period of low water, may have led to an abnormal destruction of fry by adult fish and aquatic birds.

The brood stock in the pond was increased by 523 horned pout, 895 blue gills, 144 calico bass, 3 crappie, all adults, and 2,000 horned pout fry. A gratifying number of young blue gills began to appear in the shoal water by the latter part of August. The nature of the bottom precludes observation of results with the horned pout. The arrest and prosecution of three poachers last year has put an end to troubles from this source. No distributions were made this year.

Stockwell Ponds.—The close of the year finds the construction work designed to make dams, embankments and other work water-tight, well advanced so that it will require but a moderate amount of work annually for two or three years to reach the highest level possible in all the ponds. This has already been accomplished at the Putnam Mill Pond. The wheel pit was converted into a concrete-lined catching and sorting basin for convenience in handling fish, and to prevent escapes. These improvements made it possible, in spite of the drought, to keep the ponds at a higher level than during the preceding rainy year, greatly to the benefit of the fish life.

The small stock of native pickerel, perch and shiners living in the ponds when taken over had shown a rapid increase in the two years that the ponds were being flowed, and these were reduced by distribution to make the conditions more favorable for the introduced blue gill. The blue gills made a slow increase during these two years. They bred well, and the young thrived in the ponds, but the shallowness and fermentation of the water during the construction period caused losses, and incomplete control when the water was drawn off permitted a considerable escape into Lake Singletary below.

This year, the first that the ponds were in fair working condition, and the first year that a considerable brood stock had been put in, the production was very good, and the control work now being built made it possible to separate these readily from the other fish, and handle them without escapes. There were planted in the Stockwell Ponds as breeding stock 1,380 adult blue gills, 759 horned pout (5 to 8 inches long). There were distributed from the ponds 1,250 fingerling pickerel, 4,095 adult pickerel, 2,900 adult yellow perch, 520 adult horned pout, and 32,000 fingerling and 40 adult blue gills.

FISH AND GAME DISTRIBUTION.

FISH DISTRIBUTION.

Distribution of the stock of fish from the hatcheries proceeded on the usual lines, with an increasing proportion of the work done by trucks. A system giving better team-work between the local clubs was worked out, which brought about a more even distribution of the stock turned over to them, and avoided duplication in stocking certain waters and the neglect of others simply through lack of co-ordinated effort. More clubs than before supplied trucks and called at the stations for their allotments, thus releasing more funds for other much-needed work. A rough survey was made of the stream mileage, and the allotments sent into each county were based on the proportion of stream to the total amount of fish to be planted—following the plan already in operation for pheasant distribution.

Distributions are shown in the tables at the end of this section, to which reference is made to supplement the following reports on species put out. No figures are given below which may readily be found in the tables.

Brook Trout.—Owing to the shortage of eggs no plantings of eyed eggs in brooks were made. The production of fingerlings was well in excess of last year.

Pike Perch or Wall-eyed Perch.—Pike perch work has been discontinued until the results of past stocking are more fully known. Up to this time the results have been meagre as compared with the cost of the work.

Small-mouth Black Bass.—Stock obtained by the salvage crew, together with the product of the Palmer Hatchery, comprised the supply for planting.

Horned Pout.—There were purchased from a private dealer approximately 100,000 horned pout fingerlings, which were delivered to the Palmer Hatchery and thence distributed. There were also available for stocking purposes 44,000 which had either been held over from the purchased stock of the year before or produced this year at the Palmer Hatchery, together with a number of fry, fingerlings and adults secured in salvage work and from Stockwell Ponds.

Brown Trout.—Further examinations were made to determine the suitability of certain streams in addition to those already designated to receive brown trout, having in mind (1) whether the water area to receive the fish was completely isolated by natural barriers so as to prevent them from working into desirable brook-trout waters; and (2) the species of fish already in the streams. Pursuant to the plan to develop certain selected streams as brown trout waters, the crop of fingerlings raised at the Palmer Hatchery was divided among these waters: Konkapot River, New Marlborough; Farmington River, New Boston; Heath Brook, Billerica; Westfield River at various points; Manhan River, Easthampton; Flat Brook, Ware; Eagle Hill Brook, Wareham; Millers River, Athol.

Blue Gills.—Fish collected by the salvage crew, together with the product of the Stockwell Ponds and Palmer Hatchery, comprised the stock for planting.

Alewife.—The following plantings of adult spawning alewives were made

during the spring run in continuation of the effort to re-establish depleted fisheries:— Ipswich River, Ipswich, 1,450; Ipswich River, Topsfield, 275; Monponsett Lake, Halifax, 970; Stetson Pond, Pembroke, 286; Robbins Pond, East Bridgewater, 362; Lake Nippinicket, Bridgewater, 1,222; Carver Cotton Gin Works Pond, East Bridgewater, 337. The alewives were secured and distributed by the salvage crew and wardens.

White Perch.— White perch salvage and distribution was carried along on the usual plan.

Salvage Unit.— The salvage crew continued the work of seining waters closed to public fishing for the purpose of re-distributing the stock into open ponds. There were added to the equipment two 10x4 ft. fyke traps and a 300x20 ft. seine of one-inch mesh.

With permission of the owners (whose generosity is gratefully acknowledged) the crew seined the following locations:

Storage Reservoirs at Middleton, R. I., for white perch; Oyster Pond, Falmouth, for white and yellow perch; North Watuppa Lake, Fall River, for small mouth bass fry; General Butler Ames' Pond, North Tewksbury, for blue gills, calico bass, small mouth bass, horned pout fry and adults; North Town Reservoir, Fitchburg, for pickerel and yellow perch; Flagg's Pond, Brockton, for horned pout fry; pond on the lower Cape for adult horned pout. Also throughout the season small salvage jobs by the wardens yielded varied lots of fish.

The fish taken in the salvage work were mostly of good size, a good proportion being of breeding age, and they were used as brood stock for the hatcheries, for Shaker Mill Pond and the Stockwell Pond rearing units, and for general distribution. (See table following.)

Fish Distribution, 1923.

	Product of State Hatcheries	Not Hatchery Product (Seining, Gift, Purchase, etc.)
Brook Trout:		
Eggs	— ¹	—
Fingerlings	1,376,431	—
Adults and yearlings	7,071	—
Brown Trout:		
Fingerlings	39,225	—
Adults	5 ²	—
Small Mouth Black Bass:		
Fry	131,000	137,000
Fingerlings	68,335	—
Adults	5 ²	818
Calico Bass:		
Adults	—	678
Horned Pout:		
Fry	—	28,400
Fingerlings	44,000	108,810
Adults	540 ³	4,126
White Perch:		
Adults	—	55,907
Yellow Perch:		
Fingerlings	4,000	2,300
Adults	2,900	32,500
Pike Perch:		
Adults	—	14

¹ 350 eggs sent to educational institutions for experimental purposes.

² To exhibitions, and thence distributed.

³ 20 of these to exhibitions.

	Product of State Hatcheries	Not Hatchery Product (Sein- ing, Gift, Pur- chase, etc.)
Blue Gills:		
Fingerlings	35,620 ¹	—
Adults	43 ²	2,690
Sunfish:		
Fingerlings	—	567
Roach:		
Fingerlings	—	1,012
Pickarel:		
Fingerlings	1,250	757
Adults	4,095	645
Alewives:		
Adults	—	4,902
Miscellaneous species	—	146
	<hr/> 1,714,520	<hr/> 381,272

¹ 45 of these to exhibitions.

² 3 of these to exhibitions.

All finally distributed.

GAME DISTRIBUTION.

Pheasants. — An improved system of supplying applicants with pheasant eggs for hatching was put into operation. The previous practice had been for each station to secure its full quota for the year's work, distributing any surplus, — which, being later-laid, were less fertile. In order to give the public a grade of egg of the same excellence as those used for our own work, a special stock was established at the Wilbraham Game Farm of 307 breeders of Wilbraham and Marshfield stock. The sole function of this flock was to produce eggs for distribution, and after the 8,040 eggs required to fill applications had been secured, the remaining birds, numbering 291, were liberated, still early enough to produce a brood in the open.

The number of young pheasants distributed was 40.5% above last year's output. Auto truck distribution was continued, and two season's experience has demonstrated its worth, though to cover the long distances necessary in the delivery of 500 or more birds in a day, faster trucks are needed. The recently adopted plan of apportioning the output according to the amount of suitable cover in the county insures a fairer distribution than the former plan of allotting according to demand.

White Hares. — Northern white hares from Maine were liberated to the number of 1,090. The best results from the liberated stock are sought by (1) limiting the distribution to localities which have the required natural conditions, namely, laurel, hemlock or cedar swamps to give them protection, and snow-covered ground through the winter; (2) making the distributions later in the year, to avoid, as far as possible, turning the hares loose during the open season, to fall prey to gunners before they have had a chance to propagate. While some of the distributions of necessity came in the open season (the open season coinciding with the time of year when the animals can best be trapped), nevertheless it was deferred sufficiently to allow over a month's shipments to come after the season's close. Allotments were made according to the survey of suitable white hare cover made last year, shipments going direct from trapper to applicant. A change in the Massachusetts law now permits the importation of hares and rabbits for propagation purposes at any time of year, if legally captured.

Quail. — Through the courtesy of Judge Lee Miles of Arkansas 58 Bob White quail were shipped to the Sandwich Bird Farm. Nineteen were dead on arrival and 17 died afterwards, and the remaining 22 were liberated, together with the station's product.

Game Distributions, 1923.

Species and Size	Product of State Hatcheries	Not Hatchery Product (Purchase, Gift, etc.)
Pheasants:		
Eggs ¹	— ¹	—
Young	9,466	—
Adult	619	4
Wood Ducks:		
Young	57 ²	—
Adult	1	—
Quail:		
Young	20	22
Adult	3	—
Miscellaneous	4 ³	25 ³
White hares	—	1,090
	10,170	1,141

¹8,040 pheasant eggs were distributed from the special stock kept for this purpose at the Wilbraham Game Farm.

²Birds found being held in violation of law, and confiscated.

³25 adult mallard ducks were trapped at Marshfield, and distributed, and 4 black ducks from Sandwich Bird Farm.

MARINE FISHERIES.

INSPECTION OF FISH.

The work for the year shows more activities and more seizures and condemnations of poor fish than any year since 1919, when the office was established. Last year the office aimed to cover the State to the extent of inspecting at least twice, every store selling fish. This year's more ambitious program gave at least three inspections over the whole State, and resulted in a higher quality standard of goods, and also in a larger amount seized and condemned, than in any previous year so far as retail stores are concerned. The great wholesale markets received almost daily calls, and the retail stores in large cities like Boston, Worcester, Springfield and others, received more than three visits. The wholesale, or receiving end of the fish business, that is, ports taking in fish direct from the fishing grounds, were carefully watched; for example, the great Boston Fish Pier was covered on 255 working days.

The double object was to see that fish landed by the vessels was properly graded, and that fish sold by the retailers was actually fit for food consumption. There were many individual cases where small lots of fish were seized and condemned as unfit for food. Throughout the work there has been one watchword, — to see that the consumer who pays for good fish, actually receives what he pays for.

In many instances national, county and city officials have heartily co-operated with the work of this office. On the other hand, some town and city health officials regard the work as an invasion upon their rights, and we have at present the spectacle of a town health official appearing in a court case in opposition to us.

The result of this year's work can best be gauged by public attitude toward the consumption of fish. It is admitted by the wholesale fish dealers that more fish are being consumed in Massachusetts than ever before. This would seem to show that the work of fish inspection in Massachusetts cannot be counted as

lost labor. Both dealers and the fish-eating public are not only becoming better acquainted with the fish inspection laws, but are coming to see that they are enforced for their own direct benefit. They not only welcome the visits of the inspector, but on many occasions send for him to pass judgment upon shipments of goods. As Massachusetts is the largest salt and fresh fish producing State in the country and many millions of pounds of fish landed within her borders and inspected by this office go out to other States, the basic value of the fish inspection idea can readily be seen.

Court Cases.

It has been the attitude of this office to go as far along with the "good fish education" campaign with the dealers as was humanly possible, and when it was found that this fair standpoint was abused, the guilty parties were brought into court. With the knowledge in mind, however, that every day spent by the deputies in being tied up at court was lessening their work in market inspections, a great deal of care was taken that the prosecution work should not outweigh the value of daily inspection work. For this reason, only in cases where it was deemed absolutely necessary were infractions of the law brought into court. The total number of cases brought in for the year was 23, and it is testimony to the efficiency of the work of the inspectors that 20 of these resulted in conviction, the other 3 being discharged on what might be termed technicalities. Several of these cases were very strongly contested by the defendants, which makes the work of the deputies all the more significant. Several of the cases were carried up to the Superior Court, but in every such case, decision by jury was rendered in favor of the prosecuting deputy. In many cases the Judge on the bench took occasion to lecture the defendants for trying to sell bad fish to the public.

Inspection at Producing Points.

The Inspector has personally visited the larger fish producing ports along the coast, including Gloucester, Boston, Provincetown, Chatham, Edgartown and Nantucket, and has also taken occasion to survey the retail situation in some of the larger cities. From May 1 to Oct. 1 he devoted 3 days each week to the handling of the fresh fish situation at Gloucester, where trips aggregating some 26,000,000 pounds of fish were brought in, and instead of being sold fresh for consumption, were split and salted to become the famous salt fish sold all over the country and for which Massachusetts is noted. It is the opinion of the Inspector, after making these trips, that the standard of fresh fish sold in this State will compare more than favorably with the product produced and sold in any State in the country.

During the inspection work at Gloucester it was necessary to condemn as unfit for food all but 43,000 pounds of the 175,000-pound trip of one otter trawler. It is felt that this rather drastic but necessary action on the part of the Inspector had an influence for good throughout the fishing season. Besides this condemnation, several small lots of fish, some as high as 25,000 pounds of poor fish, were condemned out of trips and thus prevented from reaching the consumer. Further, all so-called "loggy" or "sick" fish from these splitting trips were prevented from reaching those who might have made unscrupulous use of them.

Jellied Swordfish.

Last year's decision to condemn the whole of any swordfish, any part of which was found to be jellied, has been carried out with good effect. In most cases our decision was met with favor and the general attitude of the dealers was to co-operate to the fullest extent. It is felt that this decision of the office served not only to keep unwholesome fish off the market, but also to stabilize the price. As showing the effectiveness of the decision it might be stated that among the swordfish shipped to this country from Canadian ports via the Yarmouth steamer, some 50 fish weighing 14,598 pounds were condemned as being jellied, while of the swordfish landed at the Boston Fish Pier, 118 aggregating 23,132 pounds were also condemned. Besides this, many fish were also condemned at Edgartown and New Bedford.

Blackstone Street Fish Market.

As is well known, the Blackstone Street fish market is comprised of a number of carts, the owners of which are licensed by the city of Boston, and derive their supply of fish mostly from the Boston Fish Pier. Since this office was inaugurated in 1919 a strong effort has been made to clear up what has been considered to be one of the "danger spots" of the business. At the start some 15 carts were in operation. At the present time but seven are conducting the business. This market caters to the poorer class of people and this office feels that goods sold to them should be of as good quality as that provided for the more fortunate who can, and do, patronize the higher class of markets.

One by one, carts have disappeared, unable apparently to withstand the strict inspection of the deputies, giving up their business. Others, sensing the state of affairs, have made it a point to carry good goods. Still others were, in the common parlance, evidently willing to "take a chance." Some of these latter, after repeated warnings and condemnation of fish, have been brought into court, where heavy fines were imposed. At the present time, average conditions in this open air market are better than for the past five years, but as any relaxation of inspection work here would unquestionably militate against the buyer, it is intended to continue this same rigorous policy.

Out of the Blackstone Street situation, one fact comes with striking force; several of the cart proprietors are men who during the week work at and for some firms on the Boston Fish Pier. The fish they offer for sale also comes from the Fish Pier, and, as shown by inspection and condemnations, the goods offered are oftentimes actually unfit for food. The answer is obvious, and the remedy is in the hands of the Fish Pier dealers themselves.

Inspection of Imported Fish.

During the past year considerable attention has been paid to fish arriving at the port of Boston from Nova Scotia ports via the Yarmouth steamer, and to fish from Canada consigned to the Boston Fish Pier by rail. The worth of this work may be shown simply by stating that during the year from Canadian shipments, some 15,000 pounds of swordfish, over 6,000 pounds of mackerel, besides several hundred pounds of eels and smelts, have been condemned.

A plan for the inspection for these imported fish, particularly those arriving by the Yarmouth steamer, has been worked out with the hearty co-operation of Hon. W. W. Lufkin, Collector of Customs of the Port of Boston. In former years it had been the habit to open at the steamer wharf practically all of the boxes and barrels of fish shipped in; this in order that the fish might actually be weighed and the duty thereon properly assessed. As a result of conferences with Collector Lufkin, it has been possible to notify Canadian shippers of the necessity of marking their packages with the actual weight of goods therein contained, and also, instead of opening every package at the pier, to open enough to show by "average" that the amounts marked on the various packages was approximately correct, the weight of each package being later verified at the Fish Pier. This has practically saved one handling of many thousand pounds of fish, and as fish deteriorates with every handling, the point is obvious.

The commission dealers of Boston readily saw the value of the new plan, and co-operated to the extent of impressing upon their Nova Scotia shippers the necessity of making the actual weights upon each package. As a result of this agreement, no hooks are now being used on halibut, mackerel and salmon. Even the packages that are weighed to ascertain the average weight, are being handled more carefully. It is pleasing to note that as soon as the "better fish" idea is put up strongly to high officials, they immediately see the value of the plan and are willing to co-operate in every way.

Also, through co-operative effort with the office of Collector Lufkin, it has been made possible to rebate duties on fish shipped from Canada and condemned by this office. Efforts are now directed toward extending the rebate of duties on fish condemned, to rail-shipped goods coming over the border.

The Inspector of Fish acknowledges with thanks the assistance of Hon. W. W. Lufkin, Collector of Customs of the Port of Boston and patrolman George E.

Acknowledgments.

McCaffrey, special investigator attached to the office of the District Attorney of Suffolk County; also to Attorney General Jay R. Benton and District Attorneys Thomas C. O'Brien of Suffolk County and Arthur K. Reading of Middlesex County.

Work Accomplished.

Inspections in retail stores, 3,967.

Inspections in wholesale stores, 7,385.

Freezer inspections, 260.

Inspections of peddlers' carts, about 200 weekly at Boston Fish Pier.

Inspections at Yarmouth, N. S., steamer, 80.

Vessel inspections, 102.

General inspection trips, 9.

Fish condemned, landed direct from vessels, 185,520 pounds.

Fish condemned in retail stores, 5,740 pounds.

Condemned at Boston pier of the Yarmouth, N. S. steamer—190 pounds eels, 6,130 pounds mackerel, 200 pounds smelts.

Condemned at Fish Pier of consignments on Yarmouth steamer; these being graded as "jellied", 50 swordfish, 14,598 pounds.

Condemned, landed at Boston from Canada by rail and steamer, 2,834 pounds smelts.

Condemned, landed in Boston from North Carolina, 500 pounds shrimp.

Condemned at Boston Fish Pier, 250 pounds perch.

Condemned, landed at Boston Fish Pier, 5,700 pounds mackerel.

Condemned, landed at Boston Fish Pier; graded as "jellied", 118 swordfish, 23,132 pounds.

Condemned, received by rail at the Fish Pier, 1,400 pounds salmon.

Total amount condemned at Boston Fish Pier and received at Boston from Canada by rail and steamer, 53,384 pounds.

In addition to this, out of two cars of Western salmon, aggregating some 40,000 pounds, 4,980 pounds were culled as No. 2 fish; 1,965 pounds were culled as No. 3 fish and sent to be smoked, salted or otherwise preserved. It is but fair to say that a part of these shipments went along to New York without being landed at the Fish Pier, and without our knowledge.

In addition to the above many hundreds of thousands of pounds have been graded according to law, and several thousands of pounds were prevented from going into the freezer and sent to be split and salted or otherwise preserved.

Conclusion.

The latest figures issued by the United States Bureau of Fisheries show that the annual per capita consumption of fish in the United States is 14 pounds, and also that the annual per capita consumption of fish in the State of Massachusetts reached the height of 24 pounds. When it is considered that but a few years ago the per capita fish consumption in the Commonwealth of Massachusetts and in the country were approximately the same, it would seem that the action of the State in establishing this office in 1919, has borne good fruit.

THE DEEP SEA FISHERIES.

The upward slant recorded for the marine fisheries of the Commonwealth at the close of the fiscal year of 1922, has been continued during 1923 and November 30 finds the condition of the oldest industry of the State such as to cause both fishermen and dealers to review the work of the past 12 months with a greater feeling of satisfaction than at any time since the signing of the Armistice. The slump that followed this famous event is too well known to need comment. Admittedly our fisheries were then in a condition approaching demoralization and the future looked dark. The fishing and financial results for 1922, however, were such as to restore confidence that the future was safe, and now the returns for 1923 have confirmed that opinion.

The Massachusetts landings of salt water fish during 1923 were well above

1922, prices ranged generally higher, trade was improved and more stabilized; in short, it was perhaps better than a normal year, and, best of all, confidence has now fully taken the place of doubt in the minds of both those who catch and those who sell Massachusetts fish.

In some respects the 1923 returns of our fisheries were remarkable and hardly a branch can be mentioned in which the results were below that of an average year. In the first place the great fleet of winter haddockers, which markets its catches at the great Boston Fish Pier, enjoyed what competent observers declare to be the most remunerative season in all its long history. In spite of almost continual storms on the fishing grounds, the catch exceeded that of the 1922 season, prices generally held at an unusually high level and at times soared to record heights. It was a most auspicious opening of the new year—a promise of good things to come, which promise was fulfilled in many ways.

The halibut fleet, for the fifth successive year, met with marked success in its operations; the summer fresh fishing fleet operating on Georges and the fishing grounds to the eastward, brought home an aggregate of catch of splendid quality and fully up to if not ahead of the 1922 fleet in amount; the swordfishing fleet, while not landing as many fish as last year, yet because of higher sustained prices throughout the season and the absence of market glutting was able to record a very successful year. But perhaps the most pleasing chapter of the interesting marine story of the year was the turning of what promised to be an unusually lean year in the mackerel fishery into one of the most prosperous and successful in many, many years—a quarter century or more some say—this by the sudden striking in along the Massachusetts coast and contiguous waters of a flood of schools of small mackerel in the late Fall, the like of which has not been recorded since 1887 or 1888.

Another factor in the year's success for local catchers and shippers was the U. S. Tariff Act, which placed a duty on imported fresh, salt, frozen, pickled and prepared fish. These tariff provisions, while not visibly increasing the price of fish to the consumer, yet did protect to a marked degree the Massachusetts fishermen against the uneven competition of Canadian-caught fish shipped to this market and which for several years had been allowed free entry to our markets, admittedly to the financial detriment of the hardy fishers of the Old Bay State.

As to other features of the year,—a larger fleet, particularly steam otter trawlers, operated than last year and the trade in fileted fish, only recently an experiment, has increased markedly. The preparing of fish in this manner, each separate filet parchment-wrapped and shipment made in metal containers iced from without and transported in refrigerator cars both by express and fast freight, has broadened greatly the zone of safe shipment of fresh fish in large quantities; indeed, shipments have been made across the full width of the continent to San Francisco, the fish arriving in good condition. This fileting of fish has also given almost steady labor to an increased number of expert fish cutters, who at times have been obliged to work long overtime that the firms might keep up with their orders.

And so, although 1923 cannot be said to have brought unusual profits to fishermen and dealers as a whole, it has brought much to be thankful for; it has dispelled doubt and, best of all, it has brought renewed and increased confidence in the stability of the industry.

The various branches of the State's fisheries, together with résumés of fisheries operations at various ports and fishing localities are briefly and concisely treated under the following headings—

Winter Haddocking Fleet.

In all the history of this fishery, extending back some 70 years or more, the winter season of 1922 and 1923 must be recorded as the most remunerative on record. While the weather generally from December 1st until well into February and also some parts of March was severe and would naturally make for small catches, yet the large fleet of splendid sea-worthy vessels and steam trawlers engaged, apparently took little notice of it and encouraged by an exception-

ally high standard of prices offered for their goods at the Boston Fish Pier, this in part induced by a gratifying increase in demand for Massachusetts caught fish, the captains and fishermen themselves practically defying the elements and in spite of one of the worst winters in recent years as far as weather conditions were concerned, practically at times took their lives in their hands and in their efforts to secure the full benefits of high prices offered during the winter, had landed fish, up to March, at the Boston pier in excess of five million pounds over the previous season. High prices were never before so long sustained and at times the dealers on the pier were actually hungry for fish.

January was a very stormy month and opened with very light receipts which sent the prices soaring, to the effect that many large stocks were made. During this month haddock sold freely at 11¢ per pound and also reached the pinnacle of 15¢.

Lent opened on Feb. 14. It was preceded by rough weather and light catches, although some fares from Western Bank were large. The demand, in anticipation of the Lenten trade, was brisk and also continued good throughout the month. Prices continued high and the offshore vessels profited accordingly. No such conditions as these had been experienced since 1918.

The latter part of the month brought quite a marked change in the number of arrivals and the amount of fish brought in, for on February 23, the Boston Fish Pier recorded 31 arrivals with an aggregate of 1,505,550 pounds of mixed fresh groundfish, mostly large codfish, which was one of the largest day's receipts for at least over three years.

The closing week of February was marked by the largest fresh fish receipts at the Boston Fish Pier in any one week since March 1919. In the former week 5,667,090 pounds were received, three million pounds of which were large codfish and for one of the few times since the hard winter season opened in December were fish sent to the splitters.

During the month of March some of the worst storms of the season were experienced, but nevertheless the fleet stuck persistently to its hazardous work bringing fair catches and receiving the reward that the hardy fishermen deserved.

April was marked by large receipts and as was to be expected at this season of the year, prices dropped, with the splitters having their opportunity to secure a goodly supply.

The Summer Fresh Fishing Fleet.

Practically two fleets engaged in fishing for groundfish during the months from May through September, one going for capacity fares, to be landed for splitting and salted and the other tending the market at the Boston Fish pier. The vessels of the first named generally marketed their entire fares at the wharves of the Gloucester shippers and curers. At times during the season, when a good market promised, some would first try the Boston market, there discharging part of their fares, then bringing the remainder to Gloucester. The other fleet, fishing generally on Georges or in South Channel, made the Boston market their objective point at all times, making shorter trips and also bringing smaller "market" fares which went to supply the demands of the retail trade of the Boston wholesalers throughout the State, and other farther-off markets.

As in the past two years, captains and crews specialized on quality, which was pleasing to the dealers and showed the effect of the State's efforts along the line of rigid fish inspection. This quality advance had its reflection in better prices than the previous year. The season's catch aggregated about the same as last season when the total of fish brought to Gloucester for splitting and salting was about 25 millions of pounds.

Swordfishing Fleet.

The swordfishing season of 1923 resulted in a smaller catch and higher average sustained prices than 1922, which year, as far as landings were concerned, was probably the best on record. The first fish of the season, only two in number, sold at 50¢ per pound. Throughout the whole season there was no "glut" and the lowest point touched was 16¢ per pound. The first trip landed at Boston sold for 37¢ per pound, this on June 26, while the last craft to arrive home

October 9, had no difficulty in securing 35¢ per pound. This will give an idea of how well prices were sustained.

The first swordfish of the season to arrive at the Boston Fish Pier were two in number, shipped from Block Island. These fish arrived on June 19. A larger fleet probably than ever before in the history of the industry was engaged, this being due to the fact that for the first time in many years swordfish showed in large numbers on the fishing grounds "to the westward"; that is to say, that in the waters contiguous to Nantucket, Marthas Vineyard and Block Island. During the season 900 fish were landed at Woods Hole, 1,675 at New Bedford and 400 at Edgartown. Scattering fish were landed at other ports along the Cape, and even Connecticut ports received an unusual supply.

As for the swordfishery in the main, the fleet was about the same size as last year and operations were conducted practically on the same stamping grounds as of yore, Georges and Brown's Bank. Throughout the season, while there were spells of fine swordfishing weather, there were many occasions for days at a time when foggy and windy weather interfered with fishing operations.

The total landings of swordfish from Massachusetts crafts at the Fish Pier, the season closing with the last arrival on Oct. 9, amounted to 14,413 fish in count as against 17,530 last year, so that while the catch fell short of the record season, still the increased total of fish landed at ports to the southward must have brought the season's results very close to the big returns of 1922. This coupled with the much higher average price for the season marks the story of the 1923 swordfishing fleet as satisfactory both in catch and price.

The Mackerel Fishery.

Although the mackerel fishing season opened with not too satisfactory results as far as the southern fishery was concerned, and also considering that the Cape Shore fishery, usually one of the standbys as far as results are concerned, was not too gratifying, and that after that for many weeks the catch was very light, it is really gratifying to write that the mackerel season of 1923 was probably the greatest in amount of catch that has fallen to the lot of the fishers of this State since 1887. True it is that in 1896 the catch of salted mackerel was some 77,000 barrels, but these were days when, outside of the southern catch, almost all fish caught were salted on board the vessel and landed barreled and salted. Therefore the bald statement that the mackerel fishery season of 1923, as far as Massachusetts vessels are concerned, produced 121,000 barrels of fresh mackerel and 3,864 barrels of salt mackerel, shows conclusively the pre-eminence of this season's fishing. When it is considered that the great bulk of these fish were taken in a few weeks in the late fall, and most all of them caught in waters of or contiguous to the State of Massachusetts, it is safe to say that even forgetting 1888 and 1887, when the bulk of the catch was made in the Bay of Fundy, that one has to hark back to 1835 to find its equal. Therefore, it is safe to say that no mackerel season in the past 38 years has given the fisher folk of Massachusetts so great satisfaction as have the seven months just concluded.

However, it may be better, before speaking of the great "strike", to trace the operations from the spring, beginning in southern waters. The seining fleet from Gloucester, the headquarters of this fishery, was later in fitting away than last year, the first vessel sailing on April 6, whereas in 1922 the first craft got away on March 27. It is also notable that close on the heels of the first seiners the great mosquito fleet of netters also got underway and were but a few days behind their larger brethren. The fleet of seiners was somewhat smaller than last year, but it is figured, counting the sailings from all Massachusetts ports, that the fleet of netters was larger than ever. So strong was the mackerel urge that many of the Italian shore fleet ventured to the southward equipped with mackerel nets.

The first landing of southern mackerel was made by the steamer Orion, Captain John Dalhmar, on April 9 at Norfolk, Va., the craft landing but three barrels of large fish which were caught in from 30 to 40 fathoms of water in latitude 37.50 North. On arrival at the New York wholesale market these fish

brought 75¢ per pound. Following this small fares were landed at Lewes, Delaware and at Cape May. On April 12, Sch. Catherine Burke, Capt. Lemuel Firth, arrived at New York with 15,000 pounds of mackerel which weighed one-half pound each. Owing to the small size of these fish they were in light demand, first sales being 35¢ per pound and then declining to 22¢. The southern fleet continued to meet with such windy weather that often the entire fleet was forced to go into Cape May for harbor. Late in April the netters began to be heard from. Up to April 27th they had landed but 800 pounds of fish and these were caught well to the southward. During the last days in April the netters did a little better, taking their fish from 20 to 90 miles south of Cape May, the fish averaging about $2\frac{1}{4}$ pounds each, the price being so low that they were offered on the Boston market at 40¢ per pound. Up to May 4 the southern catch had been very light, owing to unfavorable weather conditions and the fleet of 15 sail of seiners and 136 sail of netters had fared poorly. For the next week the total landing of this great fleet aggregated but little better than 3,000 barrels, practically of small fish and landed at Cape May, Atlantic City and New York. By May 18, the seiners, discouraged with the outlook to the southward, were operating about Long Island and some had started for Gloucester to refit for the Cape Shore. The season up to this time had been a failure, the total catch being 7,982 barrels as against 13,584 barrels to the same date in 1922.

About now reports were beginning to come in of fish heading for the Cape Shore, word being received that on May 14 Canadian scout mackerel cruisers had sighted mackerel schooling 20 miles southwest of Cape Sable, this being three days later than the first report of last year. During the latter part of May some mackerel were found by the seiners to the southwest of Block Island. These fish were mostly large and also a number of catches of small fish were made. Up to June 1 the net fishermen continued to get a few fish in the Block Island region. Early in June came the first good reports of mackerel schooling on the Cape Shore. The first this year seemed to strike in around Sambro, in the neighborhood of Halifax, instead of showing first off Liverpool and then working up the coast. First arrivals at Boston were on June 8, when the Sch. Good Luck arrived with 70,000 pounds fresh, and Steamer Thelma with 50,000 pounds fresh. The fish were all large.

Practically speaking, the southern catch of fresh mackerel for the season was 14,000 barrels against 20,000 the previous year. Hampered by bad weather, catches on the Cape Shore were not as large as was first expected. The fish moved rapidly to the eastward and the fleet chased the fish as far as Louisburg, Cape Breton, off which port the last catches were made. Notwithstanding the bad weather and the fact that the fish worked to the eastward very quickly, the Cape Shore catch as far as fresh mackerel are concerned was practically the same as in 1922, the salted catch being a great deal smaller.

Throughout July, small mackerel weighing about one-half pound each, were taken all the way from the South Shoal Lightship to Thatcher's Island, but large mackerel were scarce. As the season advanced these small mackerel grew rapidly in size so that by the middle of July many of the fish taken weighed from $\frac{3}{4}$ of a pound to a pound each, most of the latter being taken off Cape Ann and on Middle Bank. This condition of affairs continued throughout July, the landings, however, being very small. In fact, so discouraging had become the situation that the larger part of the larger seining vessels had given up the "voyage" and were hauled up at their various wharves in Gloucester. During August the small crafts continued to land a few tinker mackerel, all practically taken on Middle Bank. The situation became so discouraging that even many of the smaller crafts forsook the pursuit of mackerel and engaged in swordfishing. During the latter part of August prospects assumed a brighter hue and over 3,000 barrels of small mackerel of very fine quality were taken on Middle Bank which encouraged greatly the mackerel fishermen.

The second week in September saw the advance guard of the catches which was to conclude in November, probably the greatest strike of mackerel that the Massachusetts coast has experienced in almost the last half century. The first fish were taken off the Maine coast, the fish being small, weighing about one

pound each, but of very fine quality. Large catches immediately followed, made off Boom Island and the Isle of Shoals. Encouraged by this good fishing, several of the large seiners immediately fitted out and sailed. To give an idea of the abundance of the fish it can be stated that in the second week in September 13,933 barrels were landed and for the week ending September 20, 21,510 barrels of fresh and 637 barrels of salted fish were added to this total.

So heavy were the landings at Boston and Gloucester that it was absolutely impossible to market all of these fish fresh and many thousands of pounds were taken to the wharves of the curers where they were split and salted. The week ending September 27 added some 19,000 more barrels to the already large growing total, the most of these fish being taken off Boston Lightship and Thatcher's Island and other Massachusetts fishing spots. As an indication of the prosperity which hit the mackerel seining fleet the statement that up to October 4th, 102,000 barrels fresh had been landed as against 39,000 barrels the previous year will tell the story far better than a column of description. The mackerel schools, as was to be expected, worked gradually toward the southward and toward the middle of October the body of fish was in the vicinity of Provincetown and good catches continued to be landed. It should be noted here that during all this time so great was the catch that the fresh fish market was absolutely unable to absorb the wonderful influx, with the consequence that practically every wharf in Gloucester was alive with men busy with splitting knives salting down fish. It can be safely estimated that at least 18,000 barrels were put under salt in Gloucester from this great drive of fish, these fish averaging salted about 300 to the barrel. The following two weeks saw landings of about 6,000 barrels weekly and then an easterly storm put quite a damper on further fishing, but it must be remembered that during most of the time previously referred to, fish were found in Cape Cod Bay with the result that up to almost the middle of November the mackerel seiners succeeded in making good catches in these waters.

The fall mackerel netters this year, the fleet not being as large as last year, delayed their start on account of the dark nights. When they got into operation they found fish very scarce and this story practically continued throughout the season, although there were one or two spurts when fortunate crafts fishing as far as 22 miles off shore were able to make large and paying hauls. Naturally the fish caught by these netters were of the largest kind, and while prices were good, they were not commensurate with the worth of the product. The netters up to the time of the closing of this report, Nov. 30, had really done poorly, but were still continuing their operations.

It can be said safely that the season of 1923 was one of the most prosperous that Massachusetts mackerel fishermen have had the fortune in the last 40 years to engage in, at least as far as financial returns are concerned, and this goes for the catch total, striking off just a few years. The fish, being of the one-pound size, were such that they were eagerly bought in the markets by the trade. Also the size proved to be a "seller" as far as salted fish were concerned and the facilities of the concerns putting up the salted article were taxed to the utmost to keep abreast of the demand of these goods. According to the judgment of expert mackerel men, next year should see a repetition of these fish along our shores because that season should bring them to the full tinker size and reproductive age. Should this belief and also this wish come true, then Massachusetts fisheries are in again, as far as mackerel is concerned, for another large year.

The Massachusetts catches of fresh and salted mackerel from December 1, 1922 to Nov. 30, 1923, inclusive; and for the corresponding period of the two previous years were as follows:

	Dec. 1, 1922 to Nov. 30, 1923	Dec. 1, 1921 to Nov. 30, 1922	Dec. 1, 1920 to Nov. 30, 1921
Salt mackerel (barrels) . . .	3,864	2,749	3,242
Fresh mackerel (barrels) . . .	121,000	50,203	40,323
	<hr/> 124,864	<hr/> 52,952	<hr/> 43,565

Cape Shore Catches of Mackerel for Eight Years.

Year	Arrivals	Fresh Mackerel (Pounds)	Salt Mackerel (Barrels)
1923	31	1,240,680	211
1922	48	1,353,900	2,344
1921	29	2,160,000	3,003
1920	30	1,290,000	3,217
1919	32	2,119,000	6,275
1918	38	1,689,000	7,558
1917	32	2,229,000	7,131
1916	24	1,161,000	3,718

Salt Bank Codfishing.

The fleet frequenting the eastern fishing grounds and salting their catches on the banks was somewhat larger than last year. When it is considered that 15 and 20 years ago this salt bank fleet so-called numbered 40 and 50 sail of fine, large vessels and known as "the backbone of the fishing fleet", one can readily discern at least one radical change that has come about in the fishing business and fish industry.

Uneven fishing was met, and while some of the vessels fared well, others of the little coterie did not do as well as anticipated. Prices were a little higher than last year, and as a whole, while the total catch was practically the same as in 1922, the result of the March to October season, each craft but one making the usual two trips, can be termed no better than "fair." As was the case last season, one Boston steam trawler operated with the fleet.

Fresh Halibut Fleet.

The continuing success of the fresh halibut fleet is a marked feature. Previous to 1919, for several years it looked as though this branch of the industry might soon be discontinued, so poor were the fishing and financial returns from the trips. Indeed for a time but seven vessels engaged, with indifferent success. But in 1919 the situation changed; the fleet was considerably enlarged, fish in goodly numbers were again found on the once prolific grounds to the eastward, Quero, Sable Island, St. Pierre, Green and Grand Banks, as well as on Georges and Browns, and the season closed with an encouragingly enlarged catch and gratifying money return, indeed the prices received, even with the increased catch definitely put Atlantic halibut in the fish luxury class and in spite of a larger fleet each succeeding year and also a gradually ascending catch total there this delicious fish remains today.

The fleet this year was the largest in recent times, some 28 crafts operating. The total catch was slightly below that of 1922.

The Gill Netting Fleet.

There is nothing of an encouraging nature to report in the operations of this fleet. As at present conducted, the fishery is pursued by less than ten boats, all of gasoline power. From December 1 to February 28 these persistent little shore fishing fellows conducted their fishery in the face of the worst weather and ice conditions since 1919 and perhaps even before that. It is to the credit of the captains and crews of these crafts that they were able to return at the end of the season in May a total of 4,156,600 pounds landed of the finest quality of fish. When it is considered that inside of ten years the fleet operating in this fishery has declined from 40 crafts to 10, the answer is plain to those who follow closely fisheries matters. The boats engaged in this fishery operated under high expenses.

Cape Cod Activities.

The fishing year as far Cape Cod is concerned showed a very gratifying forward impulse. While certain species of fish did not show in usual numbers, still others came along and were caught in such unusual quantity that it made

for the Cape a far better than an average year. At Provincetown and Chatham the traps were fortunate in having an unusual run of mackerel. These fish began to come in in June, and the run lasted until the end of the season. The Fall run of mackerel in the traps at Provincetown was probably the best on record. As for the spring fishin, in April and May the traps took mostly herring, of which there was a good catch. These fish went about 45 to 50 pounds to 100 count. The spurt of whiting, which in some years has been the major fishery, was not in evidence until late; then the fish came in in fairly good quantity, but the run was short. Squid throughout the whole season were very scarce.

Taking it altogether, the season from the freezer standpoint could be counted an average one.

At Chatham, competent judges say that the fishing year was the best for the last quarter century. Catches were good, also prices. The run of mackerel late in the spring was remarkable both for the trap and the net fishermen. The fish were extra large in size and no difficulty was found in marketing them at satisfactory prices. Later in the season small mackerel came in evidence and the traps did well, making good catches. Butterfish here were in fairly good receipt. Herring early in the season were quite plenty and taken in goodly quantity. There was quite a steady catch of squid but in no large amounts. Practically no whiting were taken.

At Barnstable and vicinity and up in the vicinity of Sandwich there was a fairly good run of whiting. Later on the traps in this vicinity shared in the splendid run of small mackerel that obtained all along the coast.

Around Plymouth County the fishing for codfish as usual was confined almost entirely to handlining and trawling from small power boats. The catch has been a normal one. The traps in Cape Cod Bay did not do as well in the catch of mackerel as last year.

To sum up the Cape Cod situation it can be said that the mackerel catch was unusually large, the herring catch was larger than the previous year, less butterfish were taken, also less squid and less whiting.

Buzzards Bay Fisheries.

The fisheries of Buzzards Bay are closed entirely to seining of all kinds and open only to handline and trap fishing under license from the State. Most of the fish in this wonderful body of water are caught for sport and for home consumption and but few sold commercially, in fact there is practically no commercial fishing in the Bay except by traps. Apparently conditions remain about the same as last year, with reports of a normal catch.

It would seem, from accurate reports regarding Buzzards Bay fisheries, that the catch in the Bay itself as far as the totals are concerned, is of very little moment when considered in the amount of fish landed at various ports in the State. Indeed, it might be said that at the present time, so far as the fishing in Buzzards Bay is concerned, "there ain't no such animal." The few traps that were set this spring did not pay for the labor, and several of them were taken up early. The prospects at the present writing indicate that very few will be set next spring.

Marthas Vineyard and Nantucket Fisheries.

The report of the Marthas Vineyard fisheries of the year shows not so successfully as the previous year. Alewives were not plenty; in fact the catch was only about 3,000 barrels, which is about one half the catch of the two preceding years.

The mackerel fishery was a failure. Possibly 200 barrels were landed at Edgartown by the spring netting fleet and after that the season was a blank.

The most encouraging feature to regard is the doings of the swordfishing fleet. This work was mostly confined to small boats with two or three men. More swordfish were found on the in-shore fishing grounds than for a number of years and the fishermen profited accordingly. It is estimated that these small boats landed at least 400 fish at Edgartown, while the larger crafts marketed their catches at Boston. The fleet in these waters was greatly aided by unusually

fine weather. The catch of bluefish and sea bass was practically nil, while more scup were taken than for several years.

At the westerly end of the island the traps had what might be termed a good season, being favored by a good catch of mackerel and quite a few butterfish. The traps, however, took but a few scup. Very few salmon were taken in the traps and no catch of bluefish is noted. There was no run of bait fish along the shore and no spurling were taken. The fishermen report seeing very few schools of porgies. The netting crafts did practically nothing.

At Edgartown the usual number of crafts engaged in the flounder fishery, the catch being quite large, as was the case in the previous year. As was to be expected, the prices at times were low, but on the general average it can be said that the flounder boats enjoyed a good season. At this port very few spring mackerel were landed. Less were landed as the warm weather came on and the most of the fleet quit operations in June.

The fisheries year at Nantucket can safely be called a good one and fully up to the standard of recent years both as regards price and production. This port is the center of the intensive flounder fishery and here congregate as a base, from 50 to 60 splendid motor equipped crafts which pursue their calling in the dangerous waters of the Nantucket shoals. The business of flounder fishing has become an all the year round one for many crafts, most of whom land their trips at Nantucket from whence they are shipped by steamer to New Bedford and thence on to the New York market which is the biggest outlet for this species of fish.

It occurs many times during the season that crafts fortunate enough to secure full cargoes will drive directly to New York and there market their catch. But as a whole the major portion of the catch of this fleet is landed and barreled and iced at Nantucket, the season's total landed there being 19,818 barrels.

Beside the amount shipped from Nantucket it is safe to figure from 35 to 40 per cent more were taken through direct to the New York market. This would give an approximate total of the state's flounder fishery of at least 10 million pounds.

As in the past two years but one craft has engaged in sturgeon fishing. This boat met with very poor success and after a short time put its nets ashore and engaged in other lines of fishing, the catch being the smallest for years.

During the spring and summer some of the fleet engaged in mackerel netting and in swordfishing, the former with very indifferent success and the latter with good fortune.

It is noticeable that while the lobster fishery, generally speaking, along the coast was far below the average, yet at Nantucket it was the best for several years.

Quite a number of crafts engaged during the summer in fishing for flukes to the southwest of the Island and did very well. These crafts fished practically in sight of land and about 20 were engaged.

In addition to the large amount of flounders landed at this port, many thousand pounds of cod and haddock were also brought in, being taken on Nantucket shoals by the flounder draggers in their otter trawls.

During the summer season quite a number of the fleet engaged in handlining on the grounds off No Man's Land, on The Rip's and on Cox's Ledge. At times as many as a dozen crafts were engaged in this line of fishing, some Edgartown boats being among them. They met with good success.

No mackerel netters engaged in local waters and very few mackerel were landed here. It is noticeable however that since the first of August the harbor was alive with great quantities of small mackerel.

Boston Fishing Activities.

The receipts at Boston this year showed a gratifying increase over 1922 of some 17 million pounds. During the winter, prices ranged higher and trade showed a gratifying and steady increase. The total here given in the table below represents the fish actually landed at the fresh fish pier and does not include fish brought to the pier by vessels which afterward went to Gloucester to

dispose of their catches. As a whole the condition at the Fish Pier showed a very gratifying improvement over 1922, the scope of marketing fresh fish being considerably increased and a noticeable improvement being made in quality shipped.

As compared with the previous year, codfish were in much greater receipt, haddock showed a slight gain, while there was a noticeable falling off in the receipts of halibut, these fancy fish being fully a million pounds short of the 1922 catch. The greatest and most gratifying gain came in fresh mackerel, where the total was close to seven million pounds marketed, something that has not been attained in the memory of the average man now in the business on the pier.

Receipts of Fish at Boston Direct from the Fishing Fleet from December 1, 1922 to December 1, 1923.

Large Codfish	23,332,261
Market Cod	14,437,335
Cod Scrod	139,495
Haddock	55,022,313
Haddock Scrod	3,194,234
Large Hake	75,319
Small Hake	3,853,305
Pollock	3,108,040
Cusk	1,858,788
Halibut	3,048,210
Fresh Mackerel	6,667,147
Miscellaneous	6,328,826
	<hr/>
	121,065,273

The above figures are furnished as usual by Fred F. Dimick, Secretary of the Boston Fish Bureau. As Mr. Dimick has for years been the authority on Boston fisheries matters it is very interesting to read the following paragraphs which are his sum-up of the year as far as the Boston Fish Pier is concerned.

"During the year 1923 the business in fresh fish has improved, but while a large quantity of fish has been distributed there is much competition, and profits have not been large. There was a large body of small mackerel on the shore, and the supply of these fish was the largest for many years. Groundfish have been in good supply, and more steam trawlers are operating than for several years.

"A number of dealers are engaged in the packing of haddock fillets in which the trade has increased. These fish are largely shipped to points west into practically new markets. This is possible, as packed in cans and wrapped in parchment paper, the fish arrive at their destination in perfectly fresh condition. Shipments have been made to California.

"The transportation charges are still high, and continue to be a drawback in the distribution of fish.

"The tariff on fish which went into effect in the Fall of 1922 has restricted shipments of fresh fish from Canada.

"The cost of operating fishing vessels has not changed much from the previous year, but the vessels as a rule have had better stocks than in the previous year. The new Sch. Lark, Capt. Ernest Parsons, stocked \$140,000, the crew sharing \$3,400 each, which is the largest stock ever made by a fishing vessel in one year engaged in the haddock fishery. While a few vessels have made big stocks the stock of the average vessel, however, has not been high.

"The catch of fish in the traps on Cape Cod has been light. The amount of bait herring taken along the shore was only about 50% as much as in the previous year.

"The outstanding feature of the year was the large catch of small mackerel which were in good demand for food fresh, and a large quantity were put into the freezers, and quite a quantity split that met with a ready sale."

The Gloucester Fisheries.

It is pleasing to note in connection with the story of the Gloucester fisheries year, again an increase in the landings. This year shows four million pounds ahead of the previous 12 months. Beside this, it can be said that Gloucester has had a good business fish year; that is to say from the amount of fish landed there has been noted an increase, gratifying to a great extent, in the shipments and market for salt fish throughout the country, put up in the attractive 1 pound to 40 pound packages. It is safe to say that the Gloucester shippers and curers, insisting upon quality products being landed at their wharves, are now reaping the benefits of that decision. Taking it all in all the fishing and business fish year has been an improvement over 1922, which year seems to mark the upward turning point following the unfortunate effects of the aftermath of the great World War.

Vessels of the Gloucester fleet marketing fish at other ports, in season, profited well. One of the greatest blessings that has been bestowed upon the city from a fishing standpoint was the wonderful catch of mackerel that happened in the late Fall of the year. These fish struck in and were caught in almost unparallel quantities and Gloucester profited accordingly. When the fresh fish market failed to absorb, as it did on many many occasions during this great mackerel rush, the only outlet for these capacity trips was to bring them to Gloucester, there to be split and salted on the wharves. It was the opportunity of decades and be it said to their credit Gloucester fish men took full opportunity thereof.

With splendid receipts during the summer fresh fishing season for ground-fish, all of which went to the splitters and curers, with Gloucester vessels profiting well in the fresh halibut industry, with the wonderful quick market for salt mackerel and a steady and constant demand for salted fish, it is not to be wondered at that the fish year in retrospect looked great as viewed through Gloucester spectacles.

The following table gives the landings of fish at this port from December 1, 1922 to November 30, 1923.

Salt Cod	6,329,669
Fresh Cod	17,849,325
Halibut	234,251
Haddock	10,293,592
Hake	2,433,566
Fresh Cusk	1,168,931
Salt Cusk	27,423
Fresh Pollock	3,378,848
Salt Pollock	37,466
Salt Haddock	150,160
Salt Hake	27,423
Flitches	4,388
Not product of American Fisheries	8,189,618
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	50,124,660
Fresh mackerel (Pounds)	5,310,489
Salt mackerel (Barreled)	4,583
Fresh herring (Pounds)	1,775,700
Salt herring (Barrels)	3,760
Cured fish (Quintals)	10,598
Bulk herring (Barrels)	8,938

Total, December 1, 1922 to November 30, 1923, 62,104,199 pounds.

SHORE FISHERIES.

Owing to the necessity of curtailing the bulk and costs of annual reports the tables of statistics hitherto published yearly in the Appendix are omitted. The totals alone are given of the returns from the shore net and pound fisheries for 1923.

Number of men engaged, 359; number of boats, 262; value of boats, \$104,-173.00; number of fish pounds, 126; value of fish pounds, \$188,650.00; number of nets, 482; value of nets, \$11,595.00; Catch in pounds,—

Alewives, 439,990
Bluefish, 2,521
Flounders, 178,537
Mackerel, 4,148,594
Menhaden, 295,336
Pollock, 160,651
Salmon, 31
Scup, 111,716

Sea bass, 9,684
Sea herring, 2,638,086
Shad, 18,712
Squeteague, 2,984
Striped bass, 31
Squid, 572,524
Tautog, 12,654
Other edible or bait species, 7,334,852

Total pounds, 15,926,903; total value, \$387,046.19.

THE LOBSTER FISHERY.

For some reason, as yet unknown and unexplained and without yet the opportunity to carefully study the serious question involved, the returns show that the lobster catch of this state for the year, after showing years of gradually increased catch, has presented a reversal of form; indeed, that the catch this year has been one of the smallest for a long time. Replies to the questionnaires sent to all parts of our coast show that of the 13 sections into which the coast is automatically divided, every section showed a decrease in catch but one. Experts in the lobster line up to the present date have been unable to give definite reasons for the serious falling off of catch and it seems that unless next year shows a return to normal it should be a matter for serious investigation. It follows as a natural sequence of short supply and large demand that prices aviated and while the fact of the serious shortage of catch should not be lost sight of, it is to be chronicled that the lobster fishermen turned in a fairly successful year because of advanced prices.

The totals of the tabulation of the returns of the year's fishing, required of the lobster men by law, follow. The complete tabulation, hitherto published in detail, is discontinued by reason of the necessity of curtailing printing expenses. The following data is compiled from reports received from the lobstermen, to and including Oct. 20, 1923.

Number of men engaged in the fishery, 648; number of boats, 824; value of boats, \$166,868.50; number of pots used, 42,569; value of pots, \$111,114.30; number of lobsters taken, 912,335; pounds of lobsters, 1,368,502; value of lobsters, \$433,349.69; number of egg-bearing lobsters taken and returned to the waters, 17,692.

As required by Chapter 130, Section 106, General Laws, it is hereby reported that the number of lobster licenses issued in 1923 was 1,142.

BOUNTIES ON SEALS.

The following towns were reimbursed by the Commonwealth for bounties paid on seals under Chap. 130, Gen. Laws, sec. 155; Barnstable, \$54; Cohasset, \$4; Duxbury, \$78; Essex, \$10; Framingham, \$2; Gloucester, \$6; Ipswich, \$2; Lynn, \$2; Newburyport, \$4; Plymouth, \$4; Provincetown, \$2; Revere, \$4; Rockport, \$2; Quincy, \$6; Rowley, \$6; Winthrop, \$2; Yarmouth, \$10. Fees to treasurers, \$49.50.

MOLLUSK FISHERIES.

It is difficult to arrive at conclusions or to secure definite figures of the catch in the absence of any central organization which would market and hence record the production, and because of the quantities taken for family use. A survey of the industry for the year was made in a general way through our wardens for office record. The information gathered shows the season of 1923 to have been, stated briefly, as follows:

Clam.

The production of clams in nearly all sections of the coast appears to have been average, and even much better in some localities.

The lease of the clam flats of Gloucester from the commonwealth to the city, under Ch. 710, Acts of 1912, was renewed for ten years.

Scallop.

The past year has witnessed little change in the scallop fishery. This year there was discovered in Buzzards Bay directly west of Meganset Harbor at North Falmouth, a fairly good bed of scallops, and the fishermen made the most of it. The 1922-1923 season as a whole averaged as only a fair year, conditions varying in different localities. In some sections a prosperous year is reported, while in others a decidedly poor one.

Oyster.

A fair season has been reported for the oyster industry, the severe winter and storms having had little or no effect on the beds. A fair set is reported at Wellfleet for the summer of 1923, while in other sections the set varies from either "very good" to "no set at all." The beds in general are said to be in good condition.

Quahaugs.

The quahaug fishery for the past season has in all instances been reported as prosperous wherever carried on. In all districts cold winter and storms had little or no effect on the fishery. Only a fair set is reported for the summer of 1923. On Cape Cod the quahaug beds are in excellent condition, while in other sections hardly fair. In every locality where quahaugs are taken they appeared during the past year higher priced than in previous years. A new bed of quahaugs in about 6 fathoms of water 2 miles to the west of Weepecket Islands was discovered, apparently covering a large area.

Shellfish in Polluted Areas.—Large sections of the coast are closed on account of the contamination of the shellfish beds,—including areas in New Bedford and Fairhaven, Lynn Harbor, Beverly, Danvers and Salem, Boston, and Cohasset.

The period for which the flats and waters of Boston Harbor and Cohasset Harbor had been closed for the taking of shellfish expired in the fall of 1923. On the request of the Department of Public Health under Section 137, Chapter 130, General Laws, this Division issued orders prohibiting the taking of oysters, clams, quahaugs and scallops in specified parts of Boston Harbor and its arms and tributaries, and in Cohasset Harbor, until such time as the Department of Public Health is satisfied that the contamination has ceased.

SHAD.

Resolve 40 of the year 1923 instructed the officials of this department to confer with the proper authorities of the State of Rhode Island, with a view to securing co-operative action designed to protect the shad fishery in Palmer's River. Report to be made to the General Court of 1924.

ALEWIFE.

Work for restoring the alewife fisheries consists of making provision for the passage of the fish; examination of obstructions and preliminary surveys of streams where unsatisfactory conditions prevail; and stocking experiments.

Fishways.

Attention was given during the spring run to conditions at existing fishways. (See "Fishways.")

Surveys.

Survey was made of the Jones River, Kingston, where several obstructions, and pollution, make adverse conditions for the alewives. Special attention was given to the first obstruction, the power dam of the town.

Records were made, for the office files, of the runs, catches, and sale prices, at the important alewife fishery sites.

Stocking Experiments.

This is the third season that mature alewives have been planted in the ponds at the headwaters of the Taunton River system,—the first year 2,698, the second 2,756, and this year 3,177. Each year there have been good numbers of

young seen in the ponds where the parent fish were placed. Weather conditions made the return of the young to the sea somewhat later than usual this fall, and even well into November large numbers of 4-7 inch alewives were seen in the ponds. According to the accepted belief as to the habits of this species, the offspring of the first year's planting should return to these ponds to spawn in the spring run of 1924.

During the spring, 1,725 mature alewives were transferred from nearby waters to the Ipswich River, as the first step in rehabilitating its fisheries.

For some years the passage of alewives between the sea and White Island Pond in East Wareham, by way of Red Brook, was prevented by the nine cranberry bog dams which lie between the lower end of the brook and the pond. This year the bog owners carried out a plan whereby, when the fish appeared in the spring in order to pass up into the pond to spawn, they were "locked" from dam to dam, and so up into the pond. Later in the year, when the schools of young alewives had collected at the pond's outlet seeking to pass down the brook to the sea, passageway through the dams was provided. If properly handled a small volume of water will insure the passage of large numbers of alewives. The above is an example of the possibilities of co-operation, so that all the possibilities on a given area may be developed.

Respectfully submitted,

WILLIAM C. ADAMS, *Director*.

APPENDIX.

RECOMMENDATIONS TO BE CONTAINED IN THE FIFTY-EIGHTH ANNUAL REPORT OF THE DIVISION OF FISHERIES AND GAME FOR THE YEAR 1923.

The director respectfully recommends the passage of laws designed to accomplish the following purposes.

Relative to Hunting and Fishing Licenses. — The law should require a fishing license in all inland waters (in which Nantucket and all ponds now fished commercially under lease from the Director are excepted.) Under existing law, a license is not required to fish in inland waters which have not been stocked since January 1, 1910. It has been a physical impossibility to stock all of the inland waters in order to do away with this distinction. It, in effect, means that the waters most recently stocked are given protection, and that the waters which have not been stocked recently (and which presumably need it most) are left without any protection. This bill will also repeal Section 15 of Chapter 131 of the General Laws which calls for a publication of the list of stocked waters. By repealing this section we will be saved the expense of publishing this list annually, to say nothing of eliminating the work connected with it. We believe the sentiment in the State is — that all fishermen should pay their share of the freight. This law will also repeal Section 11 of Chapter 131 of the General Laws. This section provides for the issuance of duplicate licenses to replace lost licenses. In order to simplify bookkeeping, and to make license holders more cautious, the repeal of this section would require the licensee to purchase a new license. At present the loser of a license must make an affidavit as to the loss, sending it to the State House before obtaining a new license.

Relative to the Date of Expiration of Lobster Licenses and to the Revocation of such Licenses. — At present the lobster licenses expire on November thirtieth. All other licenses issued by this Division expire on December thirty-first and it is desirable to have all licenses expire on the same date to make the office records uniform. This bill also provides for the revocation of a license in the event of certain violations, with the effect of putting the violator out of business for a year from the date of conviction. As the law now stands, no license can be revoked unless the holder has been twice convicted of certain specific violations. If he is convicted of fishing without a license there is nothing to prevent him from obtaining a license and resuming his work. The change provides for the revocation of his license upon conviction of a violation of any of the lobster

laws, except that, in the matter of having short lobsters, conviction shall not result in such revocation unless — per cent of the lobsters shall consist of short lobsters. It also provides that upon conviction for fishing without a license — no license can be obtained within a year from the date of conviction. We believe that every lobster fisherman who honestly desires to maintain and build up his means of livelihood will see the reasonableness of these safeguards.

Relative to damaging Property while Hunting, Trapping or Fishing. — The great majority of hunters, trappers and fishermen want to obey the law and treat the other man's property with the same consideration which they would show to such property were it their own. A small class of bad actors is constantly stirring up ill-feeling between landowners and the public. We want to help to hold this class in subjection. Nothing (outside of a jail sentence) will be as effective as the revocation of the hunting or fishing license which would result from a conviction under this proposed law.

Relative to Fishing in Inland Waters. — The law should reduce the number of traps in winter fishing from ten to five to each fisherman. This is the only further legislative restriction on winter fishing we propose. We are still of the opinion that the present open season of winter fishing is too long and too deadly. But we have decided to watch the results of recently imposed restrictions to see if the benefits are sufficient before advocating more than the above.

Investigation by a Special Commission relative to Public Hunting and Fishing Grounds and Game Refuges. — It is desirable to create a commission of five members to consider the establishment of a public shooting ground; likewise a public fishing ground to be located on the banks of some river or stream and to report to the Legislature of 1925 its recommendations thereon. There is a great amount of waste land only partly suitable for reforestation which could be utilized for this purpose with no loss to agriculture. The same is true as to fishing grounds. But such a commission could study the project in all its phases and report on what should be done, if anything, to establish such public properties in this State.